

US EPA ARCHIVE DOCUMENT

**ENVIRONMENTAL PROTECTION AGENCY**

49 CFR Parts 261, 271, and 302

[FRL-3901-8]

**Hazardous Waste Management Systems: Identification and Listing of Hazardous Waste; CERCLA Hazardous Substance Designation; Reportable Quantity Adjustment, Coke By-Products Waste Listings****AGENCY:** Environmental Protection Agency.**ACTION:** Proposed rule and request for comments.

**SUMMARY:** The Environmental Protection Agency (EPA) is today proposing to amend the regulations for hazardous waste listing under the Resource Conservation and Recovery Act (RCRA) by adding seven additional wastes generated during the production, recovery, and refining of coke by-products produced from coal to the list of hazardous wastes under 40 CFR 261.32. The EPA is also proposing to amend appendix VII of 40 CFR part 261 to add the constituents for which these wastes are being listed. The listings are being proposed pursuant to the Hazardous and Solid Waste Amendments (HSWA) of 1984.

In addition, the Agency is proposing amendments to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations in 40 CFR part 302 that are related to today's proposed waste listings. The EPA is proposing to designate all of the wastes proposed in today's rule as hazardous substances under CERCLA and is proposing to adjust the reportable quantities (RQs) that would be applicable to these wastes from the statutory level of one pound to their final RQs.

The effect of this proposed regulation, if promulgated, would be to subject these wastes to the hazardous waste regulations under 40 CFR parts 124, 262 through 266, 268, 270, and 271, and to the notification requirements under RCRA section 3010; and the notification requirements under CERCLA section 103.

In addition to the listings, the Agency is proposing a series of exclusions to the definition of solid waste designed to facilitate the recycling of the wastes proposed in today's notice. The effect of these proposals, if promulgated, will be to allow the reinsertion of the proposed wastes into a coke oven or mixing with coal tar products in an environmentally responsible fashion.

**DATES:** EPA will accept public comments on this proposed rule until September 24, 1991. For the recycling exclusions proposed in 40 CFR 261.4(a)(12), EPA will accept public comments only until August 16, 1991. Comments received after these dates will be marked late and may not be considered. Any person may request a public hearing on this proposed regulation by filing a request with EPA, to be received no later than August 12, 1991.

**ADDRESSES:** The public must send an original and three copies of their comments to: EPA RCRA Docket Clerk (OS-305), 401 M Street SW., Washington, DC 20460. The Docket Number F-91-CBPP-FFFFF should appear on all comments. The RCRA docket is located in room M2427 at the above address and is open from 9 a.m. to 4 p.m., Monday through Friday, excluding Federal holidays. The public must make an appointment to review docket materials by calling (202) 475-9327. The public may copy a maximum of 100 pages of material from any one regulatory docket at no cost; additional copies cost \$0.15 per page. Copies of the listing Background Document, Health and Environmental Effects Profiles (HEEPs), and other references that are not readily available can be viewed and copied in the RCRA docket. Certain sections of the background document contain Confidential Business Information (CBI) and are not available to the public.

Copies of materials that support the Reportable Quantities (RQs) for waste streams K141 through K145, K147, and K148 are available in Room M2427 at the U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. This docket is available for inspection between the hours of 9 a.m. and 4 p.m., Monday through Friday, excluding Federal holidays. As provided in 40 CFR part 2, a reasonable fee may be charged for copying services. Comments on the CERCLA portion of today's proposal should be sent in triplicate to: Emergency Response Division, Superfund Docket and Information Center, Attention: Docket Clerk (OS-245), Docket No. 102RQ-7COKE, room M2514, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. The docket number 102RQ-7COKE should appear on all comments.

Requests for a hearing should be addressed to Mr. David Bussard, Director, Characterization and Assessment Division, Office of Solid Waste, U.S. Environmental Protection

Agency (OS-330), 401 M Street SW., Washington, DC 20460.

**FOR FURTHER INFORMATION CONTACT:** The RCRA/Superfund Hotline at (800) 424-9346 or (202) 382-3000. For technical information on the RCRA portion of the proposal, contact Mr. Ron Josephson, Listing Section, Office of Solid Waste (OS-333), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 382-4770. For technical information on the CERCLA portion of the proposal, contact Ms. Gerain Perry, Response Standards and Criteria Branch, Office of Emergency and Remedial Response (OS-210), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (202) 382-2190.

**SUPPLEMENTARY INFORMATION:** The contents of today's preamble are listed in the following outline:

- I. Background
  - A. Introduction
  - B. Previous Listings
  - C. Proposal to List Tar Refining Wastewaters
  - D. Toxicity Characteristic Rule
  - E. Industrial Furnace Rules
  - F. Today's Proposal
- II. Summary of the Proposed Regulation
  - A. Overview of the Proposal
  - B. Industry Description
  - C. Description of Wastes
    1. Process and Waste Descriptions
      - a. Coke By-Products
      - b. Tar Refining
    2. Quantities of Waste Generated
    3. Waste Management Practices
  - D. Basis for Listing
    1. Summary of Basis for Listing
      - a. Leaching Protocols
      - b. Groundwater Models
    2. Waste Characterization and Constituents of Concern
    3. Mobility of Constituents of Concern
    4. Persistence of Constituents of Concern
    5. Health Effects of Concern
    6. Mismanagement Case Histories
    7. Conclusions
  - E. Recycling
    1. Classification as a Solid Waste
    2. Rationale for Exclusions from the Definition of Solid Waste for Coke By-Products Residuals Recycled to the Coke Oven or when Mixed with Coal Tar
    3. Descriptions of Management Practices for the Wastes Proposed for Listing as Hazardous from the Point of Generation to the Point of Reinsertion into Coke Ovens or Mixing with Coal Tar
      - a. Management Practices for Residuals from their Point of Generation to the Point of Reinsertion into Coke Ovens
        - (i) Conveyance to storage or blending unit
        - (ii) Blending of residuals with coal
        - (iii) Feeding the coke oven
      - b. Management Practices for Residuals Proposed for Listing as Hazardous Prior to Blending with Coal Tar

4. Similar Exclusion for Decanter Tank Tar Sludge (K087) when Reinserted into Coke Ovens or Blended with Coal Tar
  5. Generator Requirements
  6. Other Options
  7. Conclusions
- F. Proposal Not to List Coke By-Products Wastewaters
- G. Impact of Future Land Disposal Restrictions (LDR) Determinations
1. Request for Comment on the Agency's Approach to Pollution Prevention in the LDR Program
  2. Request for Comment on the Agency's Approach to the Development of BDAT Treatment Standards
  3. Request for Comment on the Agency's Approach to the Analyses of BDAT Treatment Capacity

### III. State Authority

- A. Applicability of Rules in States
- B. Effect on State Authorizations

### IV. CERCLA Designation and RQ Adjustment

### V. Cost and Economic Analysis

### VI. Regulatory Flexibility Act

### VII. Paperwork Reduction Act

### VIII. Compliance and Implementation

- A. Section 3010 Notification
- B. Compliance Dates for Facilities

### IX. References

## I. Background

### A. Introduction

Pursuant to section 3001 of subtitle C of RCRA, EPA proposes to list as hazardous seven wastes generated from the production, recovery, and refining of coke by-products produced from coal. Three wastes generated by this industry (EPA Hazardous Waste No. K035—Wastewater treatment sludges generated in the production of creosote; EPA Hazardous Waste No. K060—Ammonia still lime sludge from coking operations; and EPA Hazardous Waste No. K087—Decanter tank tar sludge from coking operations) currently are listed and are regulated as hazardous wastes. Another waste (process wastewater from the production of creosote) was proposed for regulation under RCRA previously (see 45 FR 33136); however, this proposal has never been finalized. The following discussion provides a brief overview of prior regulatory action affecting wastes from this industry as well as summarizes the Agency's basis for proposing to list as hazardous the wastes covered by this rule.

### B. Previous Listings

As part of its final and interim final regulations implementing Section 3001 of RCRA, EPA published several lists of hazardous wastes generated from specific and nonspecific sources. These lists have been amended several times

and are published in 40 CFR 261.31 and 261.32. Among other things, on May 19, 1980, EPA listed ammonia still lime sludge (EPA Hazardous Waste No. K060) under the category of iron and steel, and wastewater treatment sludge from the production of creosote (EPA Hazardous Waste No. K035) under the category of pesticides (see 45 FR 33123–33124).<sup>1</sup> Decanter tank tar sludge (EPA Hazardous Waste No. K087) was added to the list of hazardous wastes on July 16, 1980, under the category of coking (see 45 FR 47832).

### C. Proposal to List Tar Refining Wastewaters

The Agency also proposed to add process wastewaters from the production of creosote (*i.e.*, tar refining) to the list of hazardous wastes from specific sources (see 45 FR 33136, May 19, 1980). This proposed listing was never made final. The Agency has now tentatively decided not to list process wastewater from creosote production for the reasons explained later in this preamble (see Section I.F of today's proposal).

### D. Toxicity Characteristic Rule

On March 29, 1990, as part of its regulations implementing the Hazardous and Solid Waste Amendments of 1984, the Agency amended the Toxicity Characteristics rule (TC) (40 CFR 261.24) by adding 25 additional organic hazardous constituents to the list of toxic constituents of concern and substituting a new leaching procedure called the Toxicity Characteristic Leaching Procedure (TCLP) (55 FR 11798–11862). With the promulgation of the Toxicity Characteristic, a number of wastes generated by coke by-products plants and tar refining operations, including wastes proposed for listing in today's proposal, are expected to be characteristically hazardous because they fail the Toxicity Characteristic for benzene (one of the 25 additional organic compounds). Some wastes generated by coke by-products plants and tar refining operations may also fail the TC levels for ortho-, meta- and/or para-cresol. For some of the wastes addressed in today's proposal, analytical results from the TCLP may not completely reveal the true nature of

<sup>1</sup> Creosote, one of the major products produced by the refining of coal tar in coke by-products plants, is used as a pesticide in the preservation of wood. The Agency elected to list K035 under the industrial category of pesticides and used the term creosote production to describe the overall operation of tar refining. All tar refining operations produce creosote; therefore, there is no substantive difference in scope between the terms tar refining and creosote production.

the toxicity of these wastes owing to the difficulties that may be experienced while performing the test.<sup>2</sup> Specifically, tarry samples pose problems with sample homogenization, filtration, and dispersion of solids in the leaching medium. Because of these difficulties, EPA believes that the TCLP tends to provide analytical results which underestimate the concentrations of hazardous constituents in leachate from these wastes. Further details on the relationship of the TC and these wastes are discussed in section II.D.1 of today's proposal.

### E. Industrial Furnace Rules

On January 4, 1985, EPA promulgated amendments to the definition of solid waste which made clear that secondary materials that are burned in boilers and industrial furnaces for energy and materials recovery were solid wastes (see 50 FR 614, *et seq.*). The Agency also defined industrial furnaces as a specific list of ". . . enclosed devices that are integral components of manufacturing processes and that use controlled flame devices to accomplish recovery of materials or energy . . ." (40 CFR 260.10). Coke ovens were included on the list of devices considered to be industrial furnaces, although coke ovens do not "burn" coal.

On February 21, 1991 (see 56 FR 7134–7240), EPA promulgated permitting standards for boilers and industrial furnaces that burn hazardous waste. The standards include controls for emissions of toxic organic compounds, toxic metals, and hydrogen chloride. In addition, the rule includes provisions that subject owners and operators of boilers and industrial furnaces that burn hazardous waste to the same general facility standards applicable to hazardous waste treatment, storage, and disposal facilities.

In the preamble to the February 21, 1991 rule, EPA stated that the permitting standards apply to boilers and industrial furnaces that burn hazardous waste for the purpose of both materials and energy recovery. The February 21, 1991 preamble identified coke ovens as industrial furnaces that use hazardous waste for these two purposes and stated that these devices would be subject to regulation. However, the February 21, 1991 rule also excludes from the definition of solid waste coke and coal tar from the iron and steel industry that contain or are produced from EPA

<sup>2</sup> Research Triangle Institute, Evaluation and Modification of Method 1311 for Determining the Release Potential of Difficult-to-Filter Wastes. Final Report. April 1990.



Hazardous Waste No. K087, decanter tar tank sludge (see 56 FR 7202-7203). This exclusion extends to by-products recovered from coke oven gas generated by coke ovens charged with mixtures of coal and decanter tar tank sludge which otherwise would be considered hazardous. The Agency is today proposing to modify this exclusion for K087 wastes somewhat, and is proposing a similar exclusion for the wastes proposed to be listed in today's notice.

#### F. Today's Proposal

EPA is proposing today to amend 40 CFR part 261 by adding seven waste streams to the list of hazardous wastes from specific sources. Five wastes generated during the production and recovery of coke by-products will be added to the "Coking" section of the list, and two wastes from the refining of coal tar will be added to the "Pesticides" section.

Sections 3001 (a), (b)(1), and (e)(2) of RCRA and the Hazardous and Solid Waste Amendments (HSWA) requires that EPA determine whether to list wastes from the coke by-products industry as hazardous. A wide variety of materials fall within the scope of the term coke by-products, including coal tar, light oil, naphthalene, phenol, and coke oven gas. EPA has extensively studied the coke by-products industry and proposes, based on this evaluation and pursuant to the HSWA mandate, to list as hazardous the following seven wastes that are associated with the production, recovery, and refining of coke by-products:

- K141 Process residues from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).
- K142 Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.
- K143 Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.
- K144 Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.
- K145 Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.
- K147 Tar storage tank residues from coal tar refining.

K148 Residues from coal tar distillation, including, but not limited to, still bottoms.

The wastes covered in today's proposal (which are more fully described in Section II) include process residues and storage tank residues. The constituents of concern that are present in the proposed listed wastes are benzene and polynuclear aromatic hydrocarbons (PAHs), including benz(a)anthracene, benzo(a)pyrene, benzo(b and k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. The proposed listings do not include residuals already listed as EPA Hazardous Waste Nos. K035, K060, and K087. Rather, these proposed listings, if finalized, would supplement the existing listings and increase the quantity of waste from coke by-products recovery processes and tar refining processes regulated under subtitle C of RCRA. As discussed below, the proposed listings do not include wastewaters from coke by-products recovery and tar refining.

The Agency has collected data showing that the wastes proposed today for listing typically contain significant concentrations of hazardous constituents that cause carcinogenic, mutagenic, teratogenic, and chronically toxic effects in laboratory animals. The hazardous constituents are demonstrated to be mobile and persistent in the environment and, thus, can reach environmental receptors in harmful concentrations when the wastes are mismanaged. The Agency has evaluated these wastes using the criteria for listing hazardous wastes, which are identified in 40 CFR 261.11(a). The Agency has determined that these wastes are hazardous because they contain toxic constituents that are capable of posing a substantial present or potential hazard to human health and the environment when improperly treated, stored, transported, disposed, or otherwise mismanaged.

The sources of the wastes proposed for listing as hazardous are described in section II below and in more detail in the background document (available from the public docket at EPA Headquarters—see "ADDRESSES" section—and from the EPA Regional Libraries). Certain sections of the background document, however, contain CBI material and are not available to the public. EPA will accept petitions submitted in accordance with 40 CFR part 2 for declassifying CBI material.

A number of wastes included in today's proposal are recycled by a substantial segment of the coke by-products industry. For managing proposed EPA Hazardous Waste Nos.

K141 through K145, K147, and K148, two recycling techniques are commonly used: (1) Combining the residue with coal feedstock prior to or just after charging the coal into the coke oven; and (2) mixing the residue with coal tar prior to its being sold as a product. In addition, these same recycling practices are typical for tar decanter tank sludge, already listed as EPA Hazardous Waste No. K087.

To address both of these recycling practices, EPA today is proposing, first, to exclude the wastes proposed for listing in today's proposal from the definition of solid waste at the point of their reinsertion with feedstock into coke ovens, and, second, to exclude from the definition of solid waste coal tar products that contain or are produced from these wastes. EPA is extending the promulgation (contained in the February 21, 1991 Boiler and Industrial Furnace rule) of an exclusion from the definition of solid waste for K087 when reinserted into coke ovens (see section II.E of today's proposal and 56 FR 7202-7203).

The current and proposed exclusions would not apply prior to the point of reinsertion of the wastes into the coke ovens or prior to the point at which they are mixed with coal tar. (See 56 FR 7203.) Therefore, management of the wastes from their point of generation through the point at which they are reinserted into the coke oven or mixed with coal tar, including interim storage, would be regulated under subtitle C of RCRA. The Agency believes that recycling of wastes from these facilities achieves its goals of waste minimization in a beneficial, environmentally responsible manner. Discussion of the details of the recycling exclusion may be found in section II.E of today's proposal and in a future separate rulemaking.

Generators should note that, under 40 CFR 261.6(a)(1), hazardous wastes that are recycled are subject to the requirements for generators, transporters, and storage facilities of paragraphs (b) and (c) of that section, except for materials listed in (a)(2) and (a)(3) of that section. Under 40 CFR 261.6(b), generators and transporters of recyclable materials are subject to the applicable requirements of parts 262 and 263, and notification requirements under section 3010 of RCRA, except for materials listed in § 261.6 (a)(2) and (a)(3).

Under 40 CFR 261.6(c)(1), owners or operators of facilities that store recyclable materials before they are recycled are regulated under all applicable provisions of subparts A through L of parts 264 and 265, and

under parts 124, 266, 268, and 270, and the notification requirements under section 3010 of RCRA, except for materials listed in § 261.6 (a)(2) and (a)(3). Under 40 CFR 261.6(c)(2), owners or operators of facilities that recycle recyclable materials without storing them before they are recycled are subject to the following requirements, except for materials listed in § 261.6 (a)(2) and (a)(3):

(i) Notification requirements under section 3010 of RCRA.

(ii) Section 265.71 and 265.72 (dealing with the use of a manifest system and manifest discrepancies).

Today's proposal does not list wastewaters from the production, recovery, and refining of coke by-products. The Agency expects that some of these wastewaters may be TC hazardous for benzene. The Agency does not have sufficient data showing that PAHs are typically present in these wastewaters at levels of regulatory concern. The Agency solicits comment and any information relevant to hazardous constituents found in these wastewaters. If such data are received and they demonstrate that several hazardous constituents are typically and frequently present in wastewaters at levels of regulatory concern, the Agency may reconsider whether to list these wastewaters as hazardous.

The Agency is also not proposing to list process wastewaters from the production of creosote (tar refining operations) as hazardous. Sludges generated from the treatment of these wastewaters are already regulated under subtitle C of RCRA since they are listed as hazardous wastes (EPA Hazardous Waste No. K035).

HSWA requires the Agency to promulgate standards restricting the land disposal of newly identified wastes within six months of promulgating new listings. While today's notice does not propose land disposal restrictions for these wastes, the Agency will propose such standards in the future. The Agency's information requirements as they relate to land disposal restrictions are outlined in section II.G of this proposal.

## II. Summary of the Proposed Regulation

### A. Overview of the Proposal

This notice proposes to add seven wastes from the production, recovery, and refining of coke by-products to the list of hazardous wastes from specific sources (40 CFR 261.32).

The seven wastes are:

**K141** Process residues from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).

**K142** Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.

**K143** Process residues from the recovery of light oil, including, but limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.

**K144** Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.

**K145** Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.

**K147** Tar storage tank residues from coal tar refining.

**K148** Residues from coal tar distillation, including, but not limited to, still bottoms.

EPA has found that these wastes typically contain toxic constituents, including some that may be carcinogenic, that when mismanaged may pose a substantial present or potential threat to human health and the environment. In addition, the Agency has compiled evidence to demonstrate that the toxic constituents are mobile and persistent in the environment and are capable of reaching receptors in harmful concentrations. The information that supports these findings is summarized in this preamble and is presented in detail in the background document and other supporting materials that are available in the RCRA Docket for this proposal (see "ADDRESSES" section).

Upon promulgation of these proposed listings, all wastes meeting the listing descriptions would become hazardous

wastes under RCRA. Wastes generated prior to promulgation, however, would not be subject to regulation as hazardous waste as long as they are not actively managed after the effective date of this rule.

### B. Industry Description

The proposed regulations would list residuals from the production, recovery, and refining of coke by-products produced from coal as hazardous wastes. Coke oven gas, a coke by-product, is produced from coal along with the main product, coke. Coke by-products recovered from the coke oven gas include naphthalene, light oil, coal tar, and other marketable products. Light oil is processed further to recover benzene, toluene, and xylene. The processing of light oil to produce these products is not included in today's rule because these products are not necessarily by-products of the coke manufacturing process but may be produced by a variety of other processes. By-products and sludges generated by the light oil recovery process itself, however, are included for listing in today's proposal (K143 and K144). Coal tars usually are shipped to other facilities for coal tar refining. Because these operations usually are conducted at separate locations, the descriptions of coke production and coal tar refining industries are presented separately in this section.

In 1987, 21 domestic companies produced approximately 28 million metric tons (MT) of coke at 34 plants. The coke by-products industry is divided into two distinct segments—captive coke producers (23 plants) and merchant coke producers (11 plants). Table 1 provides the distribution of coke plants (captive and merchant) and tar refining plants by state. The 23 captive coke plants are operated by major iron and steel companies and produce blast furnace coke that is generally used on-site at integrated iron and steel plants to produce steel.

The 11 merchant coke plants generally produce coke for sale on the open market. These plants produce blast furnace coke for sale to iron and steel companies, and metallurgical coke for sale to iron and steel foundries and to other metallurgical and chemical industries.

TABLE 1.—DISTRIBUTION OF COKE PLANTS AND TAR REFINING PLANTS BY STATE

State	Number of coke plants			Number of tar refining plants
	Captive	Merchant	Total	
Alabama.....	1	4	5	2
Illinois.....	3	0	3	2

TABLE 1.—DISTRIBUTION OF COKE PLANTS AND TAR REFINING PLANTS BY STATE—Continued

State	Number of coke plants			Number of tar refining plants
	Captive	Merchant	Total	
Indiana .....	4	2	6	0
Kentucky .....	1	0	1	0
Maryland .....	1	0	1	0
Michigan .....	1	1	2	1
New York .....	1	1	2	0
Ohio .....	4	2	6	1
Pennsylvania .....	5	1	6	0
Tennessee .....	0	0	0	1
Texas .....	0	0	0	2
Utah .....	1	0	1	1
West Virginia .....	1	0	1	1
Total .....	23	11	34	11

The major by-products from coke production are coke oven gas, coal tar, naphthalene, sodium phenolate, and light oils. The coke oven gas is processed to remove the coal tars, phenols (which are used to produce sodium phenolate), naphthalene, and light oils and then is used as a fuel for noncontact heating of the coke ovens or in other processes in the coke or steel plant. In 1985, about 1,200 million liters of coal tar, 3.7 million liters of sodium phenolate, 7,700 short tons of naphthalene, and 580 million liters of light oil were produced by coke plants.

Historically, coal tar refining was a part of the coke by-products recovery operation at coke-making facilities. However, most coke plants have eliminated or have sold their tar refining operations. The crude coal tar that is produced at most coke plants now is sold to independent tar refiners for the production of other coal tar by-products.

In 1987, four companies operated 11 tar refining operations (see Table 1). Because tar refining plants depend on coke plants for their raw material, they are generally located in the vicinity of coke-making facilities. The primary products produced from coal tar at these refining facilities are light oil, creosote oil (middle fraction), refined tar (heavy fraction), and tar pitch (bottom fraction).

The 1985 production of these products was approximately 45 million liters of light oil, 500 million liters of creosote oils, 550 million liters of refined tar (excluding tar used as road tar), and 470,000 metric tons (MT) of coal tar pitch.

### C. Description of Wastes

#### 1. Process and Waste Descriptions

*a. Coke By-Products.* While coke-making operations vary somewhat with respect to the products formed, oven size, and coking time, the general process is common to all plants. Coke by-products recovery operations, however, vary to a greater extent from plant to plant, and each plant is unique in terms of the coke by-products recovered and the specific steps used for recovery operations. The most common processes involve recovery of light oil and coal tar, as well as production of ammonia, naphthalene, and phenol. Further refining of light oil and coal tar also may occur at coke plants, but, generally, these products are sent to off-site refiners for further processing. The following description provides an overview of the coke production and coke by-products recovery processed. For completeness and continuity, background information on currently listed wastes also is presented.

However, EPA is not soliciting and will not respond to comments pertaining to those wastes currently listed (K087, K060, and K035).

For coke production, coking coals are selected mainly on the basis of quality and amount of coke they will produce. About 65–70% of the coal charged is converted to coke. Mature coals (>75% carbon) are comprised mainly of polynuclear carbon ring systems connected by a variety of functional groups. Volatile matter in the coal, arising from coal decomposition, is released as coke oven gas during the coking (carbonization) process. The coke oven gas, containing benzene and PAHs, is captured to recover coke by-products and finally used as a fuel. Coke produced in the coking process is used in the manufacture of steel.

Figure 1 is a general process flow diagram that shows the points where the proposed wastes typically are generated. This process flow diagram is presented for illustrative purposes only and should not be construed to show all the unit operations in the manufacture of coke by-products. Individual facilities may have processes that are different from those shown in Figure 1 and may generate the proposed wastes at different points in the process.

BILLING CODE 6560-50-M





The following discussion describes the processes illustrated in Figure 1. Coal is charged to the coke oven and heated to temperatures between 700° and 900° C to produce coke and coke oven gas (COG). In coke ovens, the carefully blended coal charge is heated on two opposite sides so that heat travels toward the center and thus produces shorter and more solid pieces of coke. Air is excluded so that no burning takes place within the oven; the heat is supplied completely by the flues on the sides. The raw coke oven gas exits the oven at temperatures ranging from 760° to 870° C through the collecting main where it is sprayed with flushing liquor. The flushing liquor, composed primarily of water, tar, light oils, and heavy hydrocarbons, cools the coke oven gas to temperatures between 80° and 100° C. At these temperatures, the tar precipitates, and most of the nonvolatile organics condense from the gas. Coal tar, water, and ammonia are carried with the flushing liquor to the tar decanter tank (i.e., flushing liquor decanter tank). The uncondensed gas flows from the collecting main through crossover mains to the suction main, from which it enters the primary cooler. About 40 percent of the coke oven gas, after being stripped of its by-products, is returned and burned for the underfiring of a battery of ovens, and some is used on-site as fuel gas or for other purposes.

The uncondensed gas that leaves the collecting main enters the primary cooler where the gas temperature is reduced to approximately 40° C. The temperature reduction causes condensation of additional tar and liquor. Primary cooling is accomplished directly, by contacting the gas with cooling liquor in a baffled tower, or indirectly, by using countercurrent water flow in a heat exchanger. The condensate from the primary cooler flows into a tar collecting sump and is discharged into a tar decanter. The sludge that accumulates at the bottom of the collecting sump, tar collecting sump residue, must be removed periodically. The tar collecting sump residue is proposed to be listed as EPA Hazardous Waste No. K141. In most cases, this residue is recycled to the tar decanter.

The gas that exits the primary cooler is compressed in an exhauster and sent to an electrostatic precipitator (ESP), which removes entrained coal tar. The coal tar typically is routed to the tar collecting sump. In some facilities, tar from the primary cooler and ESP is discharged directly into the tar decanter tank, thereby eliminating the need for a tar collecting sump.

In the tar decanter tank, the material separates into three phases: the top layer is a dilute ammonia flushing liquor; the middle layer is coal tar; and the bottom layer contains heavy carbonaceous deposits that were entrained with the tar and liquor in the collecting main. Ammonia is a coke by-product and is removed with a dilute ammonia flushing liquor that is skimmed from the top layer in the tar decanter tank. A portion of this liquor is recycled to the collecting main. The flushing liquor system is a net generator of excess ammonia liquor that is sent to the excess ammonia liquor tank for storage. Phenols can be extracted from the excess ammonia liquor by direct contact with a countercurrent flow of light oil from the light oil recovery unit. The phenol containing light oil flows to the phenol column where the phenols are removed by reaction with caustic (sodium hydroxide or NaOH) to form sodium phenolate. The sodium phenolate and the separated light oil fraction are both sold as by-products.

Excess ammonia liquor leaving the phenol recovery unit is then sent to ammonia stills for ammonia recovery. The ammonia stills employ either caustic (NaOH) or lime (calcium hydroxide or Ca(OH)<sub>2</sub>) to react with any fixed ammonium salt to render 'free' ammonia. Alternatively, lime can be added to the ammonia liquor before it enters the ammonia still in a vessel called a preliher. Ammonia still lime sludge is generated in the ammonia stills. This ammonia still lime sludge is currently listed as EPA Hazardous Waste No. K060. No sludge (K060) is generated if only NaOH is used in the process. The waste ammonia liquor resulting from the ammonia recovery ultimately is sent to a wastewater treatment system.

The tar is drained from the middle layer of the tar decanter tank and sent for tar dewatering and then for storage. Tar dewatering reduces the water content of the tar by gravity separation. The water from tar dewatering is sent to the wastewater treatment system. Dewatered tar is sent for storage. The Agency does not have any data indicating that sludges are generated from the tar dewatering step.

Over time, a tar residue, identified in today's proposal as proposed EPA Hazardous Waste Nos. K142 for coke by-products facilities and K147 for tar distillation facilities, accumulates at the bottom of the tar storage tanks. This tar residue must be removed periodically to maintain capacity of tar storage tanks. The accumulated carbonaceous deposits at the bottom of the tar decanter tank

currently are listed as EPA Hazardous Waste No. K087—Decanter Tank Tar Sludge. This residue is collected continuously by scrapers and is either recycled via ball mills to the coke ovens or treated and disposed.

Coke oven gas exiting the electrostatic precipitator (ESP) and the reheater, is sent for ammonia recovery. The recovery of ammonia from coke oven gas is practiced at most coke by-products plants. Ammonia may be recovered from the gas stream (i.e., coke oven gas) using either the direct or indirect recovery process. The direct process involves contacting the entire gas stream with a solution of sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) in an absorber to produce ammonium sulfate crystals (after a series of drying and crystallization steps). The ammonium sulfate crystals are sold or disposed depending on market conditions. When indirect ammonia recovery is used, the gas is scrubbed with cooling water to absorb the ammonia, and the scrubbing liquor is distilled with steam in ammonia stills to yield ammonia vapor. This vapor is then reacted with sulfuric acid to produce ammonium sulfate crystals.

Coke oven gas exiting the ammonia absorber (saturator) is sent to the final cooler for naphthalene removal. Coke by-product plants use one of two distinct processes for final cooling. The most common method is direct contact final cooling (see Figure 1), which uses water as a cooling medium. The alternative cooling process uses counterflow wash oil as a cooling/ collection medium.

When water is used in the final cooler, naphthalene in the coke oven gas condenses and must be removed from the recirculating cooling water. The effluent stream from the final cooler is first sent to a sump called the naphthalene separator where the naphthalene is skimmed mechanically from the surface of the water. Naphthalene collection and recovery residue (proposed EPA Hazardous Waste No. K145) accumulates at the bottom of the naphthalene separator sump over a period of time. From the separator sump, the water is discharged to a hot sump, which acts as a collection or surge vessel for the cooling tower. From the hot sump, the water is routed at a constant flow rate through the cooling tower to a cold sump, which serves as a collection or surge tank for the cooled water before it reenters the final cooler. Naphthalene collection and recovery residues (proposed EPA Hazardous Waste No. K145) also accumulate in the hot and cold sumps, and on the surfaces of the cooling tower.



Naphthalene may also be separated from the final cooler water by sending the coke oven gas stream through a layer of tar at the bottom of the final cooler. The use of a tar-bottom final cooler allows the naphthalene to dissolve in the tar and to be included with the tar in any further refining operation. The same effect can be produced by sending the final cooler effluent stream to the tar collecting sump. The naphthalene dissolves in the tar, and the water separates out by gravity. This separated water can either be recycled to the cooling process or sent for wastewater treatment.

When the alternative wash oil cooling process is used, the material recovered from the final cooler contains naphthalene and some light oil. This stream is sent to a wash oil decanter (to remove condensed water) and then to a wash oil circulation tank. Some of the wash oil from the recirculation tank is recycled back to the final cooler through an indirect heat exchanger. The remainder is routed eventually to the light oil recovery plant (or benzol plant), which is described below, for removal of both the naphthalene and the light oil. Naphthalene collection and recovery residues (K145) are formed in the final cooler and the wash oil decanter.

After final cooling, the gas stream enters the light oil recovery stage in which the gas is scrubbed countercurrently with petroleum wash oil in a scrubber called the light oil scrubber (or benzol plant scrubber) to absorb the light oil. Material that builds up in this scrubber over time will be listed as light oil recovery residues (proposed EPA Hazardous Waste No. K143). From the scrubber, the "benzolized" wash oil is sent to the light oil stripping still or stripper to separate the wash oil from the light oil. Light oil recovery residue (proposed EPA Hazardous Waste No. K143) also includes material that accumulates in the still. Recovered light oil is then stored and subsequently sold. The wash oil is recycled to the light oil scrubber.

As the wash oil recycles through the light oil recovery process, a high-boiling-point resin is formed through polymerization reactions, which degrades the quality of the wash oil. A portion of the wash oil is removed continuously and is treated to separate this polymerized resin. The cleanup can be accomplished thermally in a wash oil purifier, gravitationally in wash oil decanters, or by using the difference in densities between the resin and the wash oil in a centrifuge (only gravitational separation in a decanter is shown in Figure 1). The polymerized

resin known as wash oil muck or muck oil (proposed EPA Hazardous Waste No. K143) accumulates over time and is removed periodically from the decanter. The cleaned wash oil is recycled to the light oil recovery cycle via the wash oil storage or recirculation tank. The material that accumulates in the storage or recirculation tank is also referred to as a light oil recovery residue (proposed EPA Hazardous Waste No. K143).

Most plants that practice light oil recovery have a sump that collects wastewaters generated in the light oil recovery area. Such wastewaters would include decanter water from the primary, intermediate, and secondary separators, as well as equipment and floor wash water. The primary purpose of the intercepting sump is to provide sufficient residence time for oil and water to separate. The separated light oil fraction is recovered by skimming and returned to the process. Sludge that accumulates in the bottom of the intercepting sump typically is removed on a periodic basis. These settled solids are residues that are defined as wastewater sump sludges from light oil recovery (proposed EPA Hazardous Waste No. K144). Wastewater from the intercepting sump usually is treated onsite prior to disposal or is used to extinction in the coke quench system.

The coke oven gas (COG) that exists from the light oil plant has a relatively high heating value. At captive plants, about 40 percent of the COG is used as fuel for the coke ovens, and the remainder is used as fuel in other steel plant operations. Merchant plants use about 40 percent of the COG as fuel for the coke ovens, and the remainder is sold as a fuel or flared. Historically, the gas from the light oil scrubber has been used as a fuel without further pretreatment. However, because the COG contains significant quantities of hydrogen sulfide ( $H_2S$ ) (roughly 1 g of  $H_2S$  per 100 m<sup>3</sup> of COG) that are converted to sulfur dioxide ( $SO_2$ ) and sulfur trioxide ( $SO_3$ ) when the gas is burned, many plants now practice COG desulfurization to reduce  $SO_2$ , ( $SO_2$  and  $SO_3$ ) emissions. The three basic types of COG desulfurization processes are (a) liquid absorption processes, (b) wet oxidative processes, and (c) dry oxidative processes. Sulfur compounds recovered from these processes may be sold or disposed, depending on market conditions.

In the coke by-products recovery plant, wastewaters from the light oil recovery process, waste ammonia liquor, and final cooler blow-down constitute the majority of liquid wastes. Other minor sources of aqueous waste

are barometric condenser wastes from ammonia crystallizers, desulfurization wastes, and contaminated waters from air pollution emission scrubbers used at charging, pushing, preheating, or screening stations.

Based on the information available from RCRA 3007 questionnaires, 49 percent of the facilities discharge these wastewaters to a POTW, 25 percent of the facilities discharge these wastewaters to surface water, 21 percent reuse these wastewaters in their process (e.g., use as quench water), and the remaining four percent of the facilities dispose of these wastewaters in underground injection wells. According to the information available to the Agency, a significant number of facilities use biological treatment to treat these wastewaters before discharging them to a POTW or through their NPDES permitted outfall. However, some facilities do discharge their wastewaters to a POTW without any treatment onsite. Most of the facilities treat their wastewaters in tanks. However, six facilities use surface impoundments to manage their wastewaters.

Based on the limited information available to the Agency, four facilities have reported storing sludges resulting from wastewater treatment in surface impoundment, one facility has reported storing sludges from wastewater treatment in waste piles, three facilities have reported disposing of sludges from wastewater treatment in landfills, one facility has reported incinerating sludges from wastewater treatment.

*b. Tar Refining.* Coal tars typically are refined at facilities other than coke plants. Coal tar is refined by either batch or continuous distillation into a number of products, including pitch, creosote, naphthalene, and tar acids. The following paragraphs discuss the tar refining steps.

A batch still is a horizontal tank used to heat the crude coal tar. Vapors from the material being distilled leave the top of the still and pass through a water-cooled condenser. The pitch (at the bottom of the horizontal tank) is heated until it reaches its softening point. At that point, the pitch is discharged from the still, cooled, and poured into barrels for storage. In the batch distillation process, high-boiling-point residues accumulate on the fire tubes and at the bottom of the still and must be removed periodically. This residue is called tar distillation bottoms or residue (proposed EPA Hazardous Waste No. K148).

When coal tar is refined using continuous distillation, the crude material is first heated in a dehydration

column, then flashed to separate its components. The heavy liquid components such as pitch and creosote are sent to a distillation column for further refining. Vapors from the flash chambers and distillation columns are sent to a fractionating column. Finished commercial products include heavy naphtha, naphthalene, creosote, and anthracene oil. No still residues are generated from the continuous process.

Tar from either of these processes is stored in tanks and, over time, a tar residue may accumulate at the bottom of the storage tanks and, if it reaches a certain level, is removed periodically. This tar residue is identified in today's proposal as EPA Hazardous Waste No. K147 (for the refining facilities). Currently EPA does not have any data that indicate residues are generated from chemical or oil storage.

The Agency realizes that the tar refining industry generates products

from still bottoms, as opposed to relying purely on distillate products. The Agency seeks comment as to which bottoms are really products, by-products, or co-products and which are, in fact, wastes. The Agency is proposing to limiting the listings to materials that are wastes, not legitimate products. The Agency also seeks comments and suggestions as to the wording of the K147 and K148 listings, so that there is no confusion in the regulated community as to the scope of the listings, if promulgated.

2. Quantities of Waste Generated

Table 2 presents estimates of the quantities of waste generated from the production of coke and coke by-products, recovery of coke by-products, and coal tar refining. These estimates are based on data supplied to EPA by the industry in response to the questionnaires sent to each operating facility in 1985, and on supplemental

data collected from all tar refiners and approximately 50 percent of the coke plants in 1987. The industry questionnaires were issued under the authority of RCRA Section 3007. The estimates were calculated using a best-estimate, production-normalized waste generation rate for each residual stream. Plant-specific waste/residual estimates of waste quantities were made based on the process description or residual characterization supplied by the plant, and using plant-specific production rates for those plants that were known to generate the residual stream. The assumptions and data used to generate these estimates are provided in detail in the Background Document for this proposed listing and in confidential data memoranda referenced in the Background Document. EPA will accept petitions submitted in accordance with 40 CFR part 2 for declassifying CBI material.

TABLE 2.—ESTIMATED NATIONWIDE WASTE QUANTITIES (MT/YR)

Waste	Quantity
K141—Process residues from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).....	3,100
K142—Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.....	10,000
K143—Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.....	4,500
K144—Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.....	900
K145—Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.....	450
K147—Tar storage tank residues from coal tar refining.....	2,600
K148—Residues from coal tar distillation, including, but not limited to, still bottoms.....	270

Source: Background Document (USEPA 1990).

3. Waste Management Practices

The principal sources of information on waste management practices are the responses to the 1985 EPA

questionnaires, the supplemental information collected in 1987, and information from States and other government agencies. Table 3 summarizes the information obtained on

management practices for the coke plant residual streams. Coal tar refining waste management practices are summarized in Table 4.

TABLE 3.—WASTE MANAGEMENT PRACTICES FOR COKE BY-PRODUCTS RECOVERY WASTES (PERCENT) <sup>1</sup>

Waste management practice	K141	K142	K143	K144	K145
	Residues from tar recovery <sup>2</sup>	Tar storage tank residues	Residues from light oil processing	Wastewater treatment sludges from light oil refining	Residues from naphthalene collection, recovery
Reuse, returned to process.....	<sup>3</sup> 100	31	53	43	100
Removed by waste removal contractor.....	0	8	13	29	0
Burned in boiler/used as fuel.....	0	31	19	14	0
Landfill.....	0	31	6	14	0
Other.....	0	0	<sup>3</sup> 6	0	0
No. of facilities responding.....	1	13	17	8	5
Percent of total coke production by responding facilities.....	5	44	27	27	18

<sup>1</sup> Percentages are based on number of facilities responding to RCRA 3007 questionnaire, which reported management practices, not number of facilities that generated waste. Totals may exceed 100 percent because many facilities reported more than one management practice.

<sup>2</sup> Only one plant reported management practices for tar collecting sump residues and that plant indicated that residues are recycled to the tar decanter. This number may not be representative of all facilities.

<sup>3</sup> Sold or stored.

Source: RCRA 3007 questionnaires.

US EPA ARCHIVE DOCUMENT

TABLE 4.—WASTE MANAGEMENT PRACTICES FOR TAR REFINING WASTES (PERCENT) <sup>1</sup>

Waste management practice	K147 tar storage tank residual	K148 tar distillation residue
Reuse, return to process.....	0	33
Removed by waste removal contractor.....	50	33
Burned in boiler/used as fuel.....	0	0
Landfill.....	50	33
Thermal evaporation in tanks.....	0	0
Other.....	0	0
Number of facilities responding.....	4	6
Percent of total tar production by responding facilities.....	50	55

<sup>1</sup> Percentages are based on number of facilities responding to the RCRA 3007 questionnaire, which reported management practices, not number of facilities that generated waste. Totals may exceed 100 percent because many facilities reported more than one waste management practice.

Source: RCRA 3007 Questionnaires.

The four primary waste management practices for coke plant residual streams are landfilling, removal by designated contractors for off-site disposal, combustion as a fuel, and reuse in the process. Further details on off-site waste management practices utilized by the contractors were not reported in the RCRA 3007 questionnaires, but presumably the wastes are either landfilled or used as a fuel because of their high heating value (> 12,000 BTU/lb).

Several recycling options are available for reuse of residuals in the process. For example, for residues from tar recovery (proposed EPA Hazardous Waste No. K141), one option is to recycle the residue to the tar decanter. Tar storage tank residuals (proposed EPA Hazardous Waste No. K142) are generally recycled to the coke oven and

introduced with the coal as feedstock. Residues from naphthalene production (proposed EPA Hazardous Waste No. K145) can be returned to the coke oven or dissolved in the tar and processed as a component of the crude coal tar. The two light oil recovery residues (proposed EPA Hazardous Waste Nos. K143 and K144) can be dissolved in the tar, dissolved in the wash oil and recycled in the light oil recovery process, or recycled to the coke oven with the coal. Two facilities reported recycling tar distillation residue (proposed EPA Hazardous Waste No. K148). One plant recycled the residue with the tar. The other plant recycled the residue to a coke plant where it was returned to the coke oven with the coal feed.

#### D. Basis for Listing

##### 1. Summary of Basis for Listing

Each of the seven wastes from coke, coke by-products, and tar refining meets the criteria for listing wastes as hazardous that is presented in 40 CFR 261.11(a)(3). Consequently, EPA is proposing that they be added to the list of hazardous wastes from specific sources appearing at 40 CFR 261.32. Hazardous constituents are typically present in these wastes at such levels that ground-water concentrations of these constituents are expected to exceed health-based levels of concern when the wastes are improperly managed. As discussed later, all the constituents of concern are carcinogens and/or systemic toxicants. All of the constituents of concern are listed as hazardous constituents in 40 CFR part 261, appendix VIII. Under plausible mismanagement scenarios, the Agency believes that these proposed hazardous wastes (proposed EPA Hazardous Waste Nos. K141 through K145, K147,

and K148) are capable of posing a substantial present or potential hazard to human health or the environment. By mismanagement scenario, the Agency means disposal in a sanitary or industrial (RCRA subtitle D) landfill, surface impoundment, open dumping, etc.

Table 5 presents the selected constituents of concern in each of the proposed wastes. Tables 6 and 7 present the range of measured concentrations of constituents in coke by-products and tar refining wastes. EPA selected the constituents of concern based on two principal factors: their known toxicity and their average concentrations in the waste. In the past, EPA's selection of constituents of concern for listed hazardous wastes has relied on comparisons of maximum reported waste constituent concentrations with health-based levels of concern. The Agency used the same selection procedure to identify the constituents of concern in the wastes being proposed for listing as hazardous. In this case, the Agency has found, as is shown and discussed later in Tables 8 through 8F, that the concentrations of constituents of concern in coke by-products wastes are so high that even projections of ground water contamination levels based on average waste concentrations (rather than maximum concentrations) exceed health-based levels of concern. Other constituents were detected in these wastes but were not selected as constituents of concern at this time because their levels of toxicity are not well established or because they typically are not present in concentrations of regulatory concern. Data on these constituents can be found in the Background Document for today's proposal.

TABLE 5.—CONSTITUENTS OF CONCERN

Constituents	K141	K142	K143	K144	K145	K147	K148
Benzene.....	X	X	X	X	X	X	-
Benz(a)anthracene.....	X	X	X	X	X	X	X
Benzo(a)pyrene.....	X	X	X	X	X	X	X
Benzo(b and k)fluoranthene.....	X	X	X	X	-	X	X
Dibenz(a,h)anthracene.....	X	X	-	X	X	X	X
Indeno(1,2,3-cd)pyrene.....	X	X	-	-	-	X	X
Naphthalene.....	-	-	-	-	X	-	-

Note.—X indicates that the constituent has been found to be present at levels of regulatory concern in the individual waste stream.



TABLE 6—Coke and Coke By-Product Wastes: Constituents of Concern and Range of Measured Concentrations (All Values in PPM)

Constituent	K141—Process residues from coal tar recovery <sup>a</sup>	K142—Tar storage tank residues		K143—Residues from light oil processing		K144—Wastewater treatment sludges from light oil refining		K145—Residues from naphthalene collection and recovery	
		Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.
Benzene .....	3,850	230-290	260	39-8,500	1,600	200-14,000	3,000	120-3,000	1,000
Benz(a)anthracene .....	7,850	5,400-7,400	8,600	ND- <sup>c</sup> 320	<sup>b</sup> 69	<15-140	<sup>b</sup> 68	<3- <sup>c</sup> 48	<sup>b</sup> 22
Benzo(a)pyrene .....	8,450	4,500-8,300	6,500	<10-130	<sup>b</sup> 34	<20-130	<sup>b</sup> 65	ND-22	<sup>c</sup> 7
Benzo(b)fluoranthene <sup>d</sup> .....									
Benzo(k)fluoranthene <sup>da</sup> .....	5,450	5,200-10,000	7,500	<5-230	<sup>b</sup> 59	15-220	<sup>d</sup> 75	ND-5	<sup>b</sup> 26
Dibenz(a,h)anthracene .....	1,750	720-1,600	1,000	ND- <sup>c</sup> 250	<sup>b</sup> 38	<7- <sup>c</sup> 31	<sup>b</sup> 15	ND-5	<sup>b</sup> 1.3
Indeno(1,2,3-cd)pyrene .....	6,150	2,000-4,100	2,900	ND- <sup>c</sup> 250	<sup>b</sup> 40	<15-77	<sup>b</sup> 36	ND-9.9	<sup>b</sup> 4
Naphthalene .....	95,000	32,000-84,000	55,000	1,400-480,000	52,000	360-53,000	27,000	5.7-300,000	140,000

<sup>a</sup> Only one data point exists. However, this residual is presumed to be comparable in composition to tar decanter sludge (listed waste K087).

<sup>b</sup> Arithmetic averages are based on one half the quantitation limit for constituents detected below quantitation limits and zero for constituents not detected (ND).

<sup>c</sup> Value represents one half the quantitation limit because the constituent was detected at trace levels.

<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results shown are the sum of the two isomers.

TABLE 7.—TAR REFINING WASTES: CONSTITUENTS OF CONCERN AND RANGE OF MEASURED CONCENTRATIONS (ALL VALUES IN PPM)

Constituent	K147—Tar storage tank residuals		K148—Tar Distillation residuals	
	Range	Avg	Range	Avg
Benzene .....	230-290	260	NA <sup>a</sup>	NA <sup>a</sup>
Benz(a)anthracene .....	5,400-7,400	6,600	160-10,000	4,500
Benzo(a)pyrene .....	4,500-8,300	6,500	330-7,300	3,600
Benzo(b)fluoranthene <sup>b</sup> .....				
Benzo(k)fluoranthene <sup>b</sup> .....	5,200-10,000	7,500	150-13,000	6,100
Dibenz(a,h)anthracene .....	720-1,600	1,000	36-1,400	800
Indeno(1,2,3-cd)pyrene .....	2,000-4,100	2,900	110-3,300	1,700
Naphthalene .....	32,000-84,000	55,000	17-2,400	850

<sup>a</sup> Constituent not analyzed (volatiles were not anticipated in still bottoms that have been heated to high temperatures).

<sup>b</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results are the sum of the isomers.

Source: Background Document.

The Agency lists a waste as hazardous if the waste poses a potential hazard to human health or the environment. In order to assess the potential hazard that a waste may pose, the Agency evaluates the potential human health and environmental risk if the waste is disposed of improperly. This risk is estimated as a function of the amount of exposure and the toxicity of hazardous constituents present in the waste stream of concern. In evaluating the risk posed by today's wastes, the Agency considered human exposure and exposure to environmental receptors from contaminated ground water. The amount of exposure to humans through ingestion of contaminated drinking water and environmental receptors via ground water is estimated from the expected concentrations of hazardous constituents in drinking water and the average amount of water consumed over the entire life span of an individual.

The expected drinking water concentrations of hazardous constituents from the wastes can be estimated as follows. First, the concentrations of these constituents

released to a leachate generated from the wastes are estimated. Then, the concentrations of these constituents in drinking water are estimated after transportation of the leachate to a drinking water well. Various alternatives, discussed below, were considered for estimating the exposure concentrations.

In order to estimate the concentration of the constituents of regulatory concern present in the proposed coke by-products wastes, EPA considered the use of leachability models and subsurface fate and transport models to estimate concentrations of these constituents in drinking water. Specifically, the Agency considered the use of the Organic Leachate Model (OLM) and the Toxicity Characteristic Leaching Procedure (TCLP) to estimate the leachate concentrations that are likely to result from the proposed wastes. This would be followed by the use of EPA's Composite Model for Landfills (EPACML) to estimate the migration of the hazardous constituents to the drinking water well. However, due to limitations in the applicability of

these models to the wastes being addressed in today's proposal, the Agency has determined that they may not be appropriate for these wastes. These limitations are discussed below.

*a. Leaching Protocols.* On November 27, 1985, the Agency proposed an organic leachate model (OLM) to estimate the amount of organic contaminants that will leach from a waste (see 51 FR 41082 and 50 FR 48886). The OLM is an empirical equation which was developed through application of modeling techniques to a data base of waste constituent concentrations and experimentally measured leachate concentrations. The OLM takes into account the concentrations of organic constituents of concern and their aqueous solubility.

However, OLM does not consider cosolvency effects and therefore, tends to underestimate pollutant mobility in waste matrices where cosolvency may be significant. EPA believes that, with the possible exception of tar distillation residues, wastes addressed in today's proposal may be subject to significant cosolvency effects.

EPA also analyzed samples of the wastes addressed in today's proposal for selected organic constituents, using the Toxicity Characteristic Leaching Procedure (TCLP) (see 55 FR 11798-11862 for details on the TC rule). Problems were encountered in applying the leaching procedure to these wastes. The principal problem with the samples of these wastes is associated with the variable amounts of tar (*i.e.*, percent solids). Tarry samples pose problems with sample homogenization, filtration, and dispersion of solids in the leaching medium when performing the TCLP. The tendency of tar to adhere to surfaces causes mass balance problems. Because of these difficulties, EPA believes that the TCLP procedure tends to provide analytical results which may underestimate the concentrations of hazardous constituents in leachates from these wastes if they are disposed of in a landfill environment. (The analytical results are provided in the Background Document for today's proposal.)

*b. Groundwater Models.* The modelling method referred to as EPACML has been used to estimate the attenuation and dilution of specific constituents during their migration through the unsaturated zone beneath a municipal landfill, and their transport through the saturated zone to a potential drinking water source (exposure point). EPACML accounts for dispersion in the longitudinal, lateral, and vertical directions; one-dimensional steady and uniform advective flow; sorption; and chemical degradation from hydrolysis.

EPACML accounts for the unsaturated zone transport modules and implements them using the Monte Carlo (probabilistic) framework.

The input concentration to the unsaturated zone transport module of EPACML corresponds to the leachate concentration at the bottom of the landfill. Under certain conditions, particularly very high constituent concentration, immiscible liquid flow can occur. For such situations, the model's inability to account for the immiscible flow condition may result in an underestimation of the receptor well concentrations. As discussed below, the wastes addressed in today's proposal typically have very high concentrations of certain hazardous constituents. Therefore, use of EPACML may result in an underestimate of concentrations of these constituents at drinking well sites.

For the reasons stated above, EPA believes that the use of available leaching and subsurface fate and transport models is not optimal for the wastes addressed in today's proposal. In addition, analytical results from the application of the TCLP to waste samples tend to understate the concentrations of hazardous constituents in leachates which may possibly originate from the wastes. However, in spite of the limitations of available methodologies for evaluating the potential health threats from these wastes, the Agency believes that the methodologies reveal high concentrations of hazardous constituents in these wastes. For that reason and because of the toxicity of

these constituents, the mobility of the hazardous constituents, and the persistence of the constituents in the environment, EPA believes that the wastes are hazardous.

After considering all of the factors of 40 CFR 261.11(a)(3), EPA concludes that these wastes are capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of. The concentrations and toxicities of hazardous constituents in the wastes are of such a magnitude that, even under conservative assumptions regarding the potential for release of these constituents to the environment and their subsequent transport in the subsurface environment, improper management of the wastes poses an unacceptable health risk. The following discussion illustrates this concern.

Tables 8 through 8F summarize the average concentrations of hazardous constituents in the wastes and the health-based concentrations of these constituents in drinking water at specified risk levels. For illustrative purposes, the tables also indicate the concentrations of these constituents when hypothetical environmental exposure factors (HEEFs), ranging from 100 to 10,000, are applied to the concentrations in the wastes. The purpose of this illustration is to indicate the concentrations of the constituents which result under a range of assumptions regarding the release of these constituents and their fate and transport in the environment.

TABLE 8.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K141

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis *	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	3,850	5.0 × 10 <sup>-3</sup>	MCL (A)	38.5	3.85	0.385	7,700	770	77
Benz(a)anthracene	7,850	1.1 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	78.5	7.85	0.785	7,100,000	710,000	71,000
Benzo(a)pyrene	8,450	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	84.5	8.45	0.845	28,000,000	2,800,000	280,000
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	5,450	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	54.5	5.45	.0545	14,000	1,400	140
Dibenz(a,h)anthracene	1,750	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	17.5	1.75	0.175	25,000,000	2,500,000	250,000
Indeno(1,2,3-cd)pyrene	6,150	2.0 × 10 <sup>-3</sup>	RSD (C)	61.5	6.15	0.615	3,100	310	31

\* Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at a 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.

<sup>b</sup> Calculated for three hypothetical environmental exposure factors (HEEFs).

<sup>c</sup> Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.

<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results show the sum of the two isomers.

Source: Background Document.

TABLE 8A.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K142

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis <sup>a</sup>	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	260	5.0 × 10 <sup>-3</sup>	MCL (A)	2.8	0.26	0.026	520	52	5
Benz(a)anthracene	6,600	1.1 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	68	6.8	0.68	66,000,000	600,000	60,000
Benzo(a)pyrene	6,500	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	65	6.5	0.65	22,000,000	2,200,000	220,000
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	7,500	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	75	7.5	0.75	19,000	1,900	190
Dibenz(a,h)anthracene	1,000	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	10	1.0	0.1	14,000,000	1,400,000	14,000
Indeno (1,2,3-cd)pyrene	2,900	2.0 × 10 <sup>-3</sup>	RSD (C)	29	2.9	0.29	1,400	140	14

<sup>a</sup> Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at a 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.

<sup>b</sup> Calculated for three hypothetical environmental exposure factors (HEEFs).

<sup>c</sup> Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.

<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results show the sum of the two isomers. Source: Background Document.

TABLE 8B.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K143

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis <sup>a</sup>	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	1,600	5.0 × 10 <sup>-3</sup>	MCL (A)	16	1.6	0.16	3,200	320	32
Benz(a)anthracene	69	1.1 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	0.69	0.069	0.007	63,000	6,300	630
Benzo(a)pyrene	34	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	0.34	0.034	0.003	110,000	11,000	1,100
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	59	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	0.59	0.059	0.006	150	15	1.5

<sup>a</sup> Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at a 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.

<sup>b</sup> Calculated for three hypothetical environmental exposure factors (HEEFs).

<sup>c</sup> Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.

<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results show the sum of the two isomers. Source: Background Document.

TABLE 8C.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K144

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis <sup>a</sup>	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	3,000	5.0 × 10 <sup>-3</sup>	MCL (A)	30	3.0	0.30	6,000	600	60
Benz(a)anthracene	68	1.1 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	0.68	0.068	0.007	61,000	6,100	610
Benzo(a)pyrene	65	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	0.65	0.065	0.007	210,000	21,000	2,100
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	75	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	0.75	0.075	0.008	180	18	1.8
Dibenz(a,h)anthracene	15	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	0.15	0.015	0.002	210,000	21,000	2,100

<sup>a</sup> Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at a 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.

<sup>b</sup> Calculated for three hypothetical environmental exposure factors (HEEFs).

<sup>c</sup> Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.

<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results show the sum of the two isomers. Source: Background Document.

TABLE 8D.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K145

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis <sup>a</sup>	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	1,000	5.0 × 10 <sup>-3</sup>	MCL (A)	10	1.0	0.10	2,200	220	22
Benz(a)anthracene	22	1.1 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	0.22	0.022	0.002	20,000	2,000	200
Benzo(a)pyrene	7	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	0.07	0.007	0.001	23,000	2,300	230
Dibenz(a,h)anthracene	15	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	0.15	0.015	0.002	210,000	21,000	2,100
Naphthalene	140,000	14	RfD	1,400	140	14	100	10	1

US EPA ARCHIVE DOCUMENT



\* Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.  
 \* Calculated for three hypothetical environmental exposure factors (HEEFs).  
 \* Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.  
 Source: Background Document.

TABLE 8E.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K145

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis *	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benzene	260	5.0 × 10 <sup>-3</sup>	MCL (A)	2.6	0.26	0.026	520	52	5
Benz(a)anthracene	6,660	1.1 × 10 <sup>-5</sup>	RSD (B <sub>2</sub> )	66	6.6	0.66	66,000,000	600,000	60,000
Benzo(a)pyrene	6,500	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	65	6.5	0.65	22,000,000	2,200,000	220,000
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	7,500	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	75	7.5	0.75	19,000	1,900	190
Dibenz(a,h)anthracene	1,000	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	10	1.0	0.1	14,000,000	1,400,000	140,000
Indeno(1,2,3-cd)pyrene	2,900	2.0 × 10 <sup>-3</sup>	RSD (C)	29	2.9	0.29	1,400	140	14

\* Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.  
 \* Calculated for three hypothetical environmental exposure factors (HEEFs).  
 \* Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.  
<sup>d</sup> GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results show the sum of the two isomers.  
 Source: Background Document.

TABLE 8 F.—BASIS FOR LISTING: HEALTH EFFECTS OF THE CONSTITUENTS OF CONCERN IN K148

Hazardous constituent	Average waste concentration detected (ppm)	Health-based water concentration limits (ppm)	Basis *	Estimated drinking well concentration <sup>b</sup> (ppm)			Calculated concentration to health-based limit ratios <sup>c</sup>		
				HEEF 100	HEEF 1000	HEEF 10,000	HEEF 100	HEEF 1000	HEEF 10,000
Benz(a)anthracene	4,500	1.1 × 10 <sup>-5</sup>	RSD (B <sub>2</sub> )	45	4.5	0.45	44,100,000	410,000	41,000
Benzo(a)pyrene	3,600	3.0 × 10 <sup>-6</sup>	RSD (B <sub>2</sub> )	36	3.6	0.36	12,000,000	1,200,000	120,000
Benzo(b)fluoranthene Benzo(k)fluoranthene <sup>d</sup>	6,100	4.0 × 10 <sup>-3</sup>	RSD (B <sub>2</sub> )	61	6.1	0.61	15,000	1,500	150
Dibenz(a,h)anthracene	800	7.1 × 10 <sup>-7</sup>	RSD (B <sub>2</sub> )	8	0.8	0.08	11,000,000	1,100,000	110,000
Indeno(1,2,3-cd)pyrene	1,700	2.0 × 10 <sup>-3</sup>	RSD (C)	17	1.7	0.17	860	86	8.8

\* Reference Dose (RfD), Risk-Specific Dose (RSD), and Maximum Contaminant Level (MCL) are explained later in the preamble, as are the classes of RSDs. Class A and B carcinogens are based on exposure limits at a 10<sup>-6</sup> risk level. Class C carcinogens are based on exposure limits at a 10<sup>-5</sup> risk level.  
 \* Calculated for three hypothetical environmental exposure factors (HEEFs).  
 \* Ratio obtained by dividing values in estimated drinking well concentration column by values in health-based, water concentration limit column for all three HEEFs.  
<sup>d</sup> GC peak resolution was not adequate to provide quantitation of two isomers individually. The results show the sum of the two isomers.  
 Source: Background Document.

The constituent levels, once the HEEF multipliers have been applied to them, are compared to their health-based numbers. Health-based numbers are based upon consideration of risk-specific doses for the constituent (see section II.D.3 of today's proposal). If the calculated level of the applicable constituent in a well is above the health-based number, the Agency considers the constituent to be one of concern and, therefore, a part of the basis for listing. The Agency also proposes to add these constituents to 40 CFR part 261 appendix VII for each of the proposed waste codes in today's proposal. The data in the tables illustrate that the wastes examined pose a potential threat to human health and the environment across an extremely broad range of assumptions regarding the mobility, fate, and transport of constituents in the wastes.

Tables 8 through 8F show that for each of the proposed wastes, the

concentrations of the constituents of concern in ground water would exceed the corresponding health-based levels of concern. The calculated ratios of estimated drinking water concentration values to health-based water-concentration-limit values presented in these tables also illustrate that even if only 0.01 percent of the average constituent levels in the wastes (*i.e.*, HEEF of 10,000) reaches environmental receptors, the exposure concentrations could exceed the health-based levels of concern by up of three orders of magnitude.

In addition to the high concentrations of hazardous constituents and the toxicity of the hazardous constituents in the wastes, the Agency also considered the mobility and persistence of the constituents in the environment. Information on the mobility and persistence of the constituents of concern are provided in sections II.D.3 and II.D.4, respectively. Information on

the toxicity of these constituents is provided in section II.D.5. Based on considerations of the concentrations of hazardous constituents in the wastes, on the toxicity of these constituents, on the mobility and persistence of these constituents in the environment, and on the other factors of 40 CFR 261.11(a)(3), EPA is proposing to list these wastes as hazardous.

2. Waste Characterization and Constituents of Concern

Tables 5, 6, and 7 list selected constituents of concern found in wastes from the production and recovery of coke by-products and tar refining, as well as the range and average concentrations for these constituents. The constituents of concern listed in the tables are carcinogens and/or systemic toxicants. All of the constituents of concern are already listed as hazardous constituents in 40 CFR part 261, appendix VIII. Waste composition data

US EPA ARCHIVE DOCUMENT

were obtained from sampling and analysis of representative waste streams at various coke plants and tar refineries. All of the selected constituents of concern were found in concentrations of regulatory concern (i.e., under plausible improper management scenarios, the constituent concentration likely to be present in ground waters are expected to be significantly higher than their health-based levels of concern for these constituents).

Other constituents that were detected in the proposed waste streams were not selected as constituents of concern for today's proposed listings because they were either not present in concentrations of regulatory concern or they do not have an established health-based number. The Agency may, however, add other constituents that were detected in today's proposed wastes to the list of constituents of concern for these wastes when the listing is promulgated based upon consideration of comments and/or additional data. Following is a list of

constituents known to be present in the proposed wastes that were not selected as constituents of concern:

acenaphthene, acenaphthylene, anthracene, benzo(g,h,i) perylene, chrysene, 2,4-dimethyl phenol, 2,4-dinitrotoluene, ethyl benzene, fluoranthene, fluorene, 1-methyl naphthalene, 2-methyl naphthalene, 2-methyl phenol, 4-methyl phenol, phenanthrene, phenol, pyrene, styrene, and toluene. The Agency solicits comments on the list of constituents that have not been included as constituents of concern. The measured concentrations of these compounds in the proposed K141 through K145, K147 and K148 wastes, and available health data on their toxicity are presented in the Background Document for this proposed rule. The addition of any or all of these constituents as constituents of concern would not affect the Agency's decision regarding listing these wastes.

3. Mobility of Constituents of Concern

The exposure pathway of principal concern is leaching and migration to

ground water. The water solubility of a given hazardous constituent is one of the indicators of its mobility (i.e., the likelihood that it will be released from a management site, will dissolve in water, and would reach a water resource of concern), and is considered by EPA among other factors in evaluating the potential of the constituent to migrate in the environment. Leaching is of concern because several of these compounds are soluble in water and could, therefore, leach from the wastes and potentially contaminate ground water. For example, the water solubility of benzene is significantly greater than its corresponding health-based level in drinking water. Thus, this constituent is capable of existing in water at significant concentrations. The solubilities and projected ground-water mobilities of the selected constituents of concern from the production, recovery, and refining of coke by-products wastes are presented in Table 9.

TABLE 9.—GROUND-WATER MOBILITY AND PERSISTENCE OF CONSTITUENTS OF CONCERN

Constituents of concern	Health-based water concentration limits (ppm)	Water solubility (ppm)	LOG <sup>a</sup> K <sub>ow</sub>	K <sub>oc</sub> <sup>b</sup>	Mobility <sup>c</sup>		Persistence <sup>e</sup>
					Slightly <sup>d</sup> contaminated medium	Highly <sup>e</sup> contaminated medium	
Benzene	5.0 x 10 <sup>-3</sup>	1.780 x 10 <sup>3</sup>	2.13	65	moderate	moderate	low
Benz(a)anthracene	1.1 x 10 <sup>-3</sup>	5.7 x 10 <sup>-2</sup>	5.61	20,000	low	high	high
Benzo(a)pyrene	3.0 x 10 <sup>-6</sup>	3.8 x 10 <sup>-3</sup>	6.06	550,000	low	high	high
Benzo(b)fluoranthene, <sup>f</sup> Benzo(k)fluoranthene <sup>f</sup>	4.0 x 10 <sup>-3</sup>	4.3 x 10 <sup>-3</sup>	6.06	550,000	low	high	high
Dibenz(a,h)anthracene	7.1 x 10 <sup>-7</sup>	5 x 10 <sup>-4</sup>	6.84	3,300,000	low	high	high
Indeno(1,2,3-cd)pyrene	2.0 x 10 <sup>-3</sup>	5 x 10 <sup>-4</sup>	6.50	1,600,000	low	high	high
Naphthalene	14	31.7	3.29	940	low	high	high

Source: CHEMWASTE Database.

<sup>a</sup>K<sub>ow</sub>=Octanol-water partition coefficient.

<sup>b</sup>K<sub>oc</sub>=Soil sorption coefficient.

<sup>c</sup>Qualitative relative evaluation of mobility and persistence, based on water solubility, log K<sub>ow</sub>, and K<sub>oc</sub>.

<sup>d</sup>Slightly contaminated medium represents a mismanagement scenario where release of hazardous constituents does not result in saturation of the underlying soil by organic hazardous constituents.

<sup>e</sup>Highly contaminated medium represents a mismanagement scenario where release of hazardous constituents results in saturation of the underlying soil by organic hazardous constituents.

<sup>f</sup>GC peak resolution was not adequate to provide quantitation of the two isomers individually. The results are the sum of the two isomers.

Also, data available to the Agency indicate that toxic PAHs are present in ground water at concentrations that far exceed their water solubility. At one site, benzo(a)pyrene was measured in ground water at a concentration of 0.08 ppm, which is greater than its reported solubility. Although the exact reason for this phenomenon is not fully understood, it is believed that the presence of these constituents in ground water is due to the oily nature of these wastes and multiphase transport. This phenomenon is discussed in greater detail in the Background Document to today's proposal.

Another factor that can provide an indication of the mobility of each

constituent is its log octanol/water partition coefficient (log K<sub>ow</sub>). The log K<sub>ow</sub> value for benzene is 2.13. According to Briggs (1977), this value indicates that benzene is moderately mobile in soil.

The PAHs (i.e., benz(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, ideno(1,2,3-cd)pyrene, and naphthalene) have high log octanol/water partition coefficients and may be predicted to be relatively immobile in soil and sediment. However, available evidence indicates that these constituents may move more readily than would be predicted in soil with a low organic content or when codisposed with other solvents or oils,

or when the waste itself is of an oily nature. They can also be transported while suspended on particulate matter in air or water.

The exact transport mechanisms for the constituents of concern in proposed EPA Hazardous Waste Nos. K141 through K145, K147, and K148 are not fully understood. However, under the plausible types of improper management to which the wastes could be subjected, the constituent concentrations that reach ground waters could be significantly higher than corresponding health-based numbers. This is shown by concentrations of some PAHs found in ground water samples as a result of

US EPA ARCHIVE DOCUMENT

solvent assisted transport. The Background Document for today's proposal provides information on PAH levels found in the ground water samples. This conclusion is consistent with the conclusions derived from application of HEEFs in the range of 100 to 10,000 for these wastes, as discussed in section II.D.1 of today's proposal.

#### 4. Persistence of Constituents of Concern

The persistence of a constituent in the environment is an important criterion considered by the Agency when determining the potential of a waste to pose a threat to human health and the environment. The chemical and biological reactivity of the constituents of concern present in today's proposed wastes indicate that they are persistent and, thus, capable of posing a significant hazard to human health and the environment. All the constituents of concern in today's proposed wastes are sufficiently persistent to result in human exposure if they are released into ground water. The principal processes that limit the persistence of these constituents in ground water are hydrolysis and biodegradation.

None of the constituents are expected to hydrolyze in water between pH 2 and 12 at ambient temperature at a rate high enough to be a limiting factor in human exposure. This is because none of the constituents of concern have structural components that would be expected to react with water under those conditions. Benzene, for example, does not react with acidic (pH 2) or alkaline (pH 14) water. Therefore, it is unlikely that hydrolysis is a significant fate for benzene. The PAHs of concern do not contain groups amenable to hydrolysis. Hydrolysis is, therefore, not thought to be a significant fate process for PAHs (Radding *et al.*, 1976). PAHs are known to be persistent in the environment. PAHs have also been detected in drinking water, surface water, ground water, soils, sediments, and air. Persistence of benzene and PAHs in the environment has been confirmed by detection of these constituents in ground water, surface water, drinking water, soil, and air.

Biodegradation is another potential degradation mechanism for each of the organic constituents of concern. Under certain aerobic conditions, organic hazardous constituents are biodegradable, as shown in controlled laboratory experiments. Although benzene is expected to biodegrade in biologically active surface water systems, it is not expected to undergo biodegradation in ground water due to

the relatively low level of biological activity in ground-water systems.

Biological degradation processes are not known to occur at a rate sufficient to prevent the spread of PAHs in the environment. Three studies reported no appreciable degradation of benzo(a)pyrene in contaminated water and sediment (Herbes and Schwall, 1977; Muller and Korte, 1975; Herbes, 1981).

#### 5. Health Effects of Concern

The Agency has obtained data demonstrating that the constituents found in the wastes generated by the production, recovery, and refining of coke by-products and tar refining are systemic toxicants and/or carcinogens. These toxic constituents are present in concentrations capable of causing adverse health effects as shown by Tables 8 through 8F. These tables illustrate that even if only 0.01 percent of the average constituent levels in the wastes reaches environmental receptors, the exposure concentrations are often three orders of magnitude higher than the health-based levels of concern. The health-based levels of concern are calculated using the three basic indicators of toxicity discussed in the following paragraphs. If the Agency assumes more conservative hypothetical environmental exposure factors (projecting less dilution prior to reaching environmental receptors) the exposure concentrations would be even higher.

For the purpose of listing wastes as hazardous under RCRA, the Agency often uses three basic indicators of toxic levels of concern: (1) Maximum Contaminant (MCLs); (2) Risk-Specific Doses (RSDs) for known carcinogens; and (3) Reference Doses (RfDs) for systemic toxicants.

MCLs are final Drinking Water Standards promulgated under Section 1412 of the Safe Drinking Water Act of 1974, as amended in 1986, for both carcinogenic and noncarcinogenic compounds. In setting MCLs, EPA considers a range of pertinent factors (for details, see 52 FR 25697-25701, July 8, 1987).

Where MCLs are not yet established, the Agency has developed oral RSDs for many carcinogenic constituents. The RSD is a dose that corresponds to a specified level of risk of an individual contracting cancer over a 70-year lifetime due to the presence of the toxicant in drinking water. In order to develop an RSD, a risk level must be specified. EPA specifies the risk level for a constituent of concern by using a weight-of-evidence scheme that is based on an assessment of the quality and adequacy of experimental data and the

kinds of responses induced by a suspect carcinogen. The carcinogenic constituents of concern in proposed EPA Hazardous Waste Nos. K141 through K145, K147, and K148 for which no MCLs exist are either probable human carcinogens (Class B<sub>2</sub>)—based on a combination of sufficient evidence, in animals and inadequate human or no human data—or possible human carcinogens (Class C)—based on limited evidence in animals and the absence of human data. Details on the other classes of carcinogens are given in the Background Document. The oral RSDs for carcinogenic agents are calculated at the 10<sup>-6</sup> risk level for Class B carcinogens and at the 10<sup>-5</sup> risk level for Class C carcinogens. These risk levels are consistent with the risk levels used to delist specific waste streams.

In addition, oral Reference Dose numbers (RfDs) are established for non-carcinogenic constituents for which MCLs have not been developed. An RfD is an estimate of the daily exposure to a substance for the human population (including sensitive subgroups) that appears to be without an appreciable risk of deleterious effects during a lifetime of exposure. If frequent exposures that exceed the RfD occur, the probability that adverse effects may be observed increases. The method for estimating the RfD for non-carcinogenic end points was described in the proposed rule for the Toxicity Characteristic (51 FR 21648, June 13, 1986).

The hazardous constituents of concern found in the wastes proposed for listing today have produced carcinogenic or other chronic systemic effects in laboratory animals or humans. EPA has established RfDs, RSDs or MCLs for all of the constituents of concern in coke by-products and tar refining wastes. These constituents have been detected in the wastes from the production, recovery, and refining of coke by-products in concentrations sufficient to pose a substantial threat to human health and the environment. The health-based levels of concern calculated for the constituents of concern in Table 8 through 8F are based on two assumptions: (1) That the average person has a body mass of 70 kg and, (2) that a person drinks an average of 2 liters of test solution daily over a period of 70 years. The Agency's Carcinogen Assessment Group (CAG) has determined that there is substantial evidence to suggest that benz (a) anthracene, benzene, benzo (a) pyrene, benzo (b and K) fluoranthene, dibenz (a, h) anthracene, and indeno (1, 2, 3-cd) pyrene are carcinogens. Epidemiological



evidence from studies of coke oven workers and tar roofers demonstrates the carcinogenic potential of the materials generated by coke ovens and tar refining. A brief summary of the toxicity and health effects of these constituents is presented in this preamble. A more detailed discussion is included in the Background Document for today's proposal.

Benzene is a class A carcinogen. Benzene is carcinogenic in rats after exposure by gavage and in mice following exposure by inhalation (IARC, 1982). An epidemiological study that correlated benzene exposure with the incidence of leukemia provides sufficient evidence that benzene is carcinogenic in humans (NTP 85-002).

Benzo(a)anthracene (BA) is a Class B<sup>2</sup> carcinogen. BA has been found to be carcinogenic in experimental mice following oral administration, dermal application, subcutaneous injection, and bladder implantation (IARC, 1973). Oral exposure to BA resulted in an increased incidence of hepatomas and pulmonary adenomas in the mouse (Klein, 1963).

Benzo(a)pyrene (BaP) is a Class B<sub>2</sub> carcinogen. BaP is perhaps one of the most potent animal carcinogens known. Microgram quantities have been shown to induce tumors in a number of experimental animal species via several routes of exposure, including oral, inhalation, and dermal application (IARC, 1973). The types of tumors seen after exposure to BaP include mammary tumors in rats (IARC, 1973); squamous cell papillomas and/or carcinomas of the forestomach in mice (Rigdon and Neal, 1966); and skin tumors in mice (Poel, 1963). BaP can also act as a transplacental carcinogen in mice (Bulay and Waterberg, 1971).

Benzo(b and k)fluoranthenes (BbF and BkF) are class B<sub>2</sub> carcinogens. BbF and BkF have both been shown to be dermal carcinogens in mice (IARC, 1973). BkF also induces tumor formation when injected subcutaneously in mice (Lacassagne *et al.*, 1963) and directly into the pulmonary tissue of rats (Deutsch-Wenzel *et al.*, 1983).

Dibenz(a, h)anthracene (DBA) is a Class B<sub>2</sub> carcinogen. DBA produced tumors in mice following oral, dermal, or subcutaneous administration (IARC, 1973). The types of tumors seen in mice after exposure to DBA by various routes include adenomas carcinomas of the skin (Wonder and Hoffman, 1959); pulmonary alveolar carcinomas and adenomatosis; mixed-type mammary tumors; hemangioendotheliomas involving the pancreas and mesenteric and abdominal lymph nodes; and precancerous lesions of the small intestine (Snell and Stewart, 1962).

Indeno(1,2,3-cd)pyrene (IP) is a Class C carcinogen. IP is considered carcinogenic to experimental animals based on dermal application and subcutaneous injection studies on the mouse. Dose-related increases in the incidence of skin tumors have been observed in mice that received dermal applications of this chemical (IARC, 1973).

Several of the constituents of concern, including benzene (IARC, 1982), BaP (Shum *et al.*, 1979), DBA (Wolfe and Byran, 1939), and naphthalene (Harris *et al.*, 1979) have also been shown to be embryotoxic and/or teratogenic in experimental animals. Also, naphthalene has been shown to be embryotoxic in humans (Zinkham and Childs, 1958; Anziulewisc *et al.*, 1959).

In addition to their ability to act as carcinogens, several of these constituents (as well as other PAHs that express no carcinogenicity on their own) have been found to act as initiators or promoters (cocarcinogens) of skin tumors in mice. Chemicals found to initiate skin tumors after a single application or multiple applications followed by croton oil treatment (a classical promoter) include BA (Hadler *et al.*, 1959); BbF (Van Duuren *et al.*, 1966); BkF (LaVoie *et al.*, 1982); DBA (Klein, 1960); and IP (IARC, 1973).

It is important to note that PAHs other than the constituents of concern, are known to be present in the wastes proposed for listing in today's notice, and may have the ability to act as cocarcinogens. PAHs such as benzo(g,h,i)perylene (BghiP), fluoranthene, and pyrene are not carcinogenic *per se*. When applied to the skin of mice along with a carcinogen such as BaP, however, they can often enhance the carcinogenic effect of BaP (e.g., IARC, 1983; Van Duuren and Goldschmidt, 1976). This cocarcinogenic phenomenon is of concern because many of the waste streams proposed for listing in today's notice contain mixtures of PAHs that are carcinogens and cocarcinogens. This factor indicates that, for some PAH mixtures, the health-based levels of concern presented earlier (which are based on exposure to individual compounds) may underestimate the toxicity of these compounds when found in the wastes as mixtures of PAHs.

Almost all of the PAHs considered here possess some degree of mutagenicity in short-term tests for genotoxicity. Chemicals found to induce mutations in at least one strain of *Salmonella typhimurium* include BA (e.g., Claxton, 1983); BaP (e.g., McCann *et al.*, 1975); and IP (e.g., LaVoie *et al.*, 1979). Other evidence for genotoxicity

includes induction of sister chromatid exchanges by BA (Tong *et al.*, 1981a, 1981b) and by BaP, BbF, and DBA (Rozinski and Kocher *et al.*, 1979); and morphological transformation in a number of *in vitro* test systems by DBA and IP (Chen and Heidelberger, 1969 and Emura *et al.*, 1982).

## 6. Mismanagement Case Histories

A number of environmental damage incidents have occurred in the past due to the mismanagement of coke by-products and tar refining wastes. These incidents show that constituents present in these wastes are capable of reaching environmental receptors in potentially harmful concentrations. The cases describing environmental contamination with coke by-products and tar refining wastes can be found in the docket supporting the listing of EPA Hazardous Waste Nos. K141 through K145, K147, and K148.

As a basis for illustrating the environmental contamination associated with coke by-products, EPA has identified several incidents where the management of the coking wastes in question has resulted in environmental damage and increased risk to human health. To illustrate the hazards posed by these wastes when mismanaged, EPA has summarized the following studies:

Polynuclear Aromatic Hydrocarbon Sediment Investigations conducted in Region V, including five sites involved in coke production; and,

Six specific case studies conducted at plants that engage in various types of activities that involve coal tar and other coking by-products.

The case studies presented below illustrate the threat posed to human health and environment by these wastes. As discussed previously, these wastes may contain levels of benzene and PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b and k)-fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. When improperly treated, stored, transported, or disposed, the PAHs and benzene in these wastes have been shown to migrate into the environment. In such a case, these wastes pose a threat to human health and the environment.

In previous discussions (sections II.D.1.a and II.D.1.b of this proposal), EPA focused upon quantifying the levels of constituents (benzene and select PAHs) that would pose a hazard to the environment when mismanaged. In summarizing these case studies, EPA provides actual examples where the mismanagement of the coking wastes of concern has resulted in environmental

damage. Specifically, the Agency supplies examples where the concentrations of benzene or select PAHs in ground water exceeds acceptable health levels.

*a. PAH Sediment Investigation.*

Results of sediment studies conducted downstream of the coke operation discharges on the Black River in Ohio indicate that high levels of PAHs are present and that these contaminants adversely affect fisheries located on the river. For example, it is documented (Baumann and Fabacher, 1985) that elevated levels of PAHs are responsible for the occurrence of tumors on fish from the Black River. Due to these results and because of the large number of coke plants in EPA Region V, the Region decided to undertake a series of surveys to determine the extent of sediment contamination by PAHs in the Region. The case studies include six sites in Illinois, Indiana, Ohio, and Michigan that are or were engaged in the production of coke and steel. As a result of operations at these plants, the surrounding rivers, including the Calumet, the Cuyahoga, the Mahoning, the Ohio and the Rouge Rivers, have been contaminated by PAHs through the discharge of treatment wastewaters bearing coking processing wastes.

The wastewaters from the sites resulted from such processes as coke quenching, ammonia liquor distillation, and processing of coal tars. These wastewaters varied in the degree of both contamination and treatment that they underwent before discharge and contained some or all of the wastes that are considered under this listing. The exact percentage of coke wastes discharged with the wastewaters, however, has not been quantified.

At each facility, river sediments were collected above and below each wastewater discharge, as well as the area immediately surrounding the discharge. At each site, these samples confirmed that high levels of PAH contamination had occurred below and near the site being studied. The levels of contamination varied directly with the distance away from the outfall from the plant, both upstream and downstream with downstream concentrations markedly higher than those upstream. The PAHs were found to have contaminated the rivers at the various sample sites at levels up to and including the following concentrations: naphthalene—38,000 ppm, benzo(a)anthracene—7,600 ppm, benzo(b)fluoranthene—8,000 ppm, indeno(1,2,3-cd)pyrene—6,000 ppm, and dibenz(a,h)anthracene—1,100 ppm. These levels of contamination were

found to be significantly higher than the levels that are acceptable by health-based standards.

The sampling measurements, however, reflect concentrations in sediments while the health-based standards refer to maximum allowable concentrations in water. While this difference may limit the comparability of the two measurements, the studies still indicate a hazard since the water and sediment at the sites are in direct contact. Further, since the PAHs occur in the sediments in high concentrations, the constituents may migrate to the surface and drinking waters and present an even greater hazard to human health and the environment.

*b. Specific Site Evaluations.*

Summaries of selected cases describing environmental contamination by constituents of concern present in coke by-products and tar refining wastes are described below. These sites include a manufacturing plant (which conducted coking operations), a coal tar by-products manufacturing plant, a coal gasification plant, a tar refiner, a wood preserving and coal tar distillation facility, and a disposal site for wastes from three sources. Each of these sites described below involved ground water contamination by PAHs and benzene.

*Site 1*

A steel manufacturing plant operating in New York from 1920 through 1983 on Lake Erie was the site of contamination caused by several different wastes, including coking wastes. Various coking wastes were mixed with other wastes at most of the sites involved, although two disposal areas received coking wastes almost exclusively.

At this facility, excess blast furnace and steelmaking slags, as well as steel scrap and coking wastes were initially dumped directly into Lake Erie and then into pits and landfills located on a man-made peninsula created at the point where a creek discharges into Lake Erie. The slag fill extended approximately 1,700 feet off the shoreline of the lake and raised the subsurface elevation more than 50 feet. Of 160 pits/landfills located on the peninsula, two waste management areas, a pit and a landfill, have been identified as areas that were designated to receive coking wastes. Ground-water monitoring wells were installed in the areas to assess the migration of contaminants from these hazardous waste management areas to ground water. Coking wastes that were co-disposed in the pit and landfill include K060, K087, and the proposed K141-K145 wastes. As a result of this co-disposal, constituents in the coking wastes have migrated from the fill

materials to the ground water and possibly to the lake.

The concentrations of naphthalene and benzene (up to 720 ppm and 340 ppm respectively) from these two sites were found to be well above the accepted health-based levels for these constituents. Although the source of these constituents may include non-coking process wastes, the coking process wastes have contributed significantly to the problem. Coking waste is the main contributor to the PAH problem, although non-coking process wastes may also affect the level of PAHs and benzene present in the samples. The ground-water monitoring results indicate that the levels of PAHs and benzene in this case are significant and that they pose a threat to human health and the environment.

*Site 2*

A manufacturer of coal tar by-products along the east bank of the Ohio River in West Virginia was involved in ground-water monitoring to examine the level of contamination resulting from plant activities. These activities included using crude coal tar as feedstock to produce three major products: refined chemical oil, creosote, and industrial pitch. Monitoring results showed that activities both at this plant and at a nearby coke facility led to ground water contamination by coal tar residuals (proposed K147 and K148). The studies examined the shallow, perched aquifer and the alluvial aquifer. These investigations revealed varying extent of contamination in all aquifers. This contamination was due to uncontrolled seepage and discharge of pollutants into the Ohio River. The following constituents were found to have contaminated the aquifers at levels up to and including the following concentrations: naphthalene—92,000 ppm, benzo(a)anthracene—4,000 ppm, benzo(b)fluoranthene—4,100 ppm, indeno(1,2,3-cd)pyrene—1,200 ppm, and dibenz(a,h)anthracene—21 ppm. These concentrations are well above the accepted healthbased levels for these constituents.

*Site 3*

A coal gasification plant was the site of soil and groundwater contamination. Tar and soil contaminated with tar were widely distributed over the site as a result of plant operations. Materials found at coal gasification sites are similar in nature to those found at coke by-products facilities. The site is listed in the National Priorities List (NPL) of hazardous waste sites.

The coal gasification site is known to have coal tar and other coal gasification wastes present in three locations: a tar pit, two ponds, and in an area of tar boils (tar refining). The total estimated volume of tar in these areas is 5000 yd<sup>3</sup>. The deepest penetration of tar was observed at a location adjacent to the ponds where a slight tar odor was also detected at a depth of 50 feet.

Three shallow, water-bearing strata (aquifers) exist at a depth of less than 60 feet under the site. In some locations at the site these three aquifers are separated by fine clay materials, while in other locations one aquifer is in direct contact with a deeper aquifer, allowing waters from the two aquifers to mix. There is evidence of contamination in the two shallower aquifers. Concentrations of benzene, phenols, and PAHs ranging from 5 to 30 µg/L were detected in the shallowest aquifer water, while PAH concentrations up to 14,000 µg/L were detected in wells tapping the middle aquifer. Surface water quality was determined on several occasions at five locations. Analytical data indicate that a variety of organic compounds are present in surface waters, including some of the constituents of concern in today's proposal

#### Site 4

A former sand and gravel pit was the disposal site of wastes from three sources from 1945 to 1977. Wastes from a tar refining plant, foundry sand from an iron foundry, and wastes from a gravel company were disposed at this site. The site was assigned to the NPL in September 1983 due to the extent of its soil and ground-water contamination.

Both soil and ground water in areas around the pit showed evidence of contamination. Soil boring and ground-water samples confirmed that the ground water below and near the site was contaminated with organics. This contamination reaches the Ohio River with a north plume extending to the iron company's production wells, in which benzene has been measured from nondetectable levels to 36 ppb (parts per billion).

Evidence of ground-water contamination below the pit includes trace levels of anthracene and phenanthrene detected in nine out of ten wells drilled through the north end of the pit at varying depths (detection limits for these compounds ranged from 10 µg/L to 16,000 µg/L). Benz(a)anthracene was also detected at trace levels in four of these wells. The highest ground-water concentration of benzene was at 18,000 µg/L.

In addition, analysis of soil borings indicated that a 10 to 15 foot layer on

top of the bedrock underlying the pit appears to be contaminated with organics (the bedrock begins at a depth of 80 ft). The intermediate zone between the bottom of the pit and the lower contaminated zone appears to be only slightly contaminated. This phenomenon suggests that nonaqueous phase substance contaminants have moved through the sand and gravel aquifer to the underlying impermeable layer.

#### Site 5

At another site, a tar refiner functioned from 1917 to 1972. As a result of PAH contamination of four area aquifers, this site is now included on the NPL. According to the Record of Decision (ROD) report, contamination of one of the deeper aquifers is believed to be the result of injection of creosote and process waste products directly into the facility's deep well located on-site. The well permeates the deep aquifers. Another method of migration of contaminants into this aquifer, called the Prairie du Chien-Jordan Aquifer, is believed to be from overflow into the well casing during on-site runoff events and spills.

Primary methods of contamination of the uppermost aquifers, the Drift and Platteville aquifers, are believed to be through contaminated soil at the site and at the bog south of the site. Contamination is not evenly distributed throughout the bog but appears to be more representative of a channel through the bog. According to the ROD data, the migration of contaminants from the ditches used to dispose of wastes has caused contamination of the aquifers. The Minnesota Department of Health (MDH) believes that the St. Peter Aquifer, which is located to the east of the site probably is contaminated due to ground-water migration from the Drift and Platteville aquifers. Further sampling of wells near the site is expected to confirm this assumption.

#### Site 6

An NPL site was used as a wood preserving and coal tar distillation facility from 1910 to 1962. Stormwater runoff flows to two stormwater drainage ditches which flow into an aquatic habitat. Sampling of the site indicated that there were two discrete areas of contamination: (1) the southern portion of the site, which was where the coal tar refining and wood treating operations were located, and (2) the northern portion of the site where an inactive disposal pond was situated. The average attenuation depth of organic compounds in the soils in the southern site area is about 58 feet. The primary contaminants of concern affecting the ground water,

soils, and sediments are volatile organic compounds (VOCs) including benzene, toluene, and xylenes; other organics, including PAHs; and metals.

Soil staining was observed at 15 of 139 auger boring locations and at 29 of 82 soil boring locations. Total surficial soil PAH concentrations in the four surface/surficial soil samples which were analyzed ranged from below detection limits to 8,567 mg/kg. Benzo(a)pyrene was measured at a concentration as high as 210 mg/kg, benz(a)anthracene was measured as high as 340 mg/kg, and the concentration for combined benzo(b and k) fluoranthene was measured as high as 290 mg/kg.

The primary compounds found in the shallow aquifer below the site were PAHs, VOCs, and metals. The maximum concentrations of total PAHs were measured at 22,000 mg/L. Benzo(a)pyrene was measured at a maximum concentration of 570 µg/L, and benzo(b and k) fluoranthene was measured at a maximum concentration of 1,200 µg/L. The ROD data indicate that the same contaminants were present in an adjacent deeper aquifer, but at lower concentrations.

A total of eighteen surface water samples and five sediment samples were collected from on-site drainage ditches bordering the site. Surface water data did not show any site-specific contamination. In the sediment samples, PAH compounds were detected in concentrations ranging from 2.3 mg/kg to 240 mg/kg. Benzo(a)pyrene was measured at a concentration of 30 mg/kg. Benz(a)anthracene was measured at 5.6 mg/kg, and benzo(b and k) fluoranthene was measured at 59 mg/kg.

## 7. Conclusions

The criteria in 40 CFR 261.11(a)(3) specify that the Agency will list a waste as hazardous if it contains constituents listed in Appendix VIII and, after considering the factors enumerated in 40 CFR 261.11(a)(3), the Agency concludes that the waste is capable of posing a substantial present or potential hazard to human health or the environment when improperly managed. After considering these factors, particularly the toxicity, mobility, persistence, and the concentration of hazardous constituents in these wastes, the Agency concludes that these wastes meet the criteria for listing. The Agency, therefore, is proposing to add the wastes described in this notice to the list of hazardous wastes in 40 CFR 261.32.



### E. Recycling

A number of residuals proposed to be listed as hazardous wastes are recycled by a substantial segment of the coke by-products industry (see Tables 3 and 4 for waste management practices for the residuals proposed for listing). Two recycling techniques are currently in use: (1) Using mixtures of the residuals and coal to charge coke ovens and (2) mixing the residuals with coal tar prior to its being sold or refined. These recycling practices are also commonly used for tar decanter sludge, which is already listed as a hazardous waste (EPA Hazardous Waste No. K087) from the coke by-products industry. Coke and coal tar containing tar decanter sludge, K087, are currently exempt from regulation as hazardous wastes under 40 CFR 261.4(a)(10); however, the sludge is still considered a solid waste if not recycled. In the November 29, 1985 final rule (50 FR 49170) and the February 21, 1991 final rule (56 FR 7203), EPA concluded that the hazardous constituents are not present in coke derived from K087 at levels that would pose substantial risk to human health and the environment and that the recycling of K087 into coke by-products does not increase levels of hazardous constituents in coal tar.

EPA has studied and analyzed these practices for each of the proposed listed residuals to determine (a) whether these practices constitute waste management and should, therefore, be regulated as such or (b) whether the proposed residuals are being used in ongoing, continuous manufacturing processes and should, therefore, not be regulated under RCRA. Based on this analysis, the Agency has determined that while the proposed residuals would be solid wastes under 40 CFR 261.2, the Agency has determined it is appropriate to exclude proposed EPA Hazardous Waste Nos. K141 through K145, K147, and K148 from the definition of solid waste when these wastes are reinserted into coke ovens and when blended with coal tar product that is sold. As explained fully below, EPA believes that regulation of the material when reinserted is not necessary to protect human health and the environment, and will further the objectives of waste minimization and pollution prevention.

The effect of these exclusions would be that the coke oven, using mixtures of these residuals as feedstock, and the materials derived from them in the coking process, would not be regulated under Subtitle C of RCRA. Also, the tar refining process, using mixtures of these residuals and coal tar as feedstock would not be subject to regulation under

Subtitle C of RCRA. EPA's rationale for providing these exclusions from the definition of solid waste is presented in section 2.

The proposed exclusions would not apply prior to the reinsertion of the wastes into coke ovens or mixtures with coal tar for use as product. Management of these wastes up to that point may present a hazard to human health and the environment and would, therefore, be regulated under RCRA subtitle C. These waste management practices include removal and transportation, interim storage, or processing of the residuals at any time from their point of generation to the point of reinsertion into coke ovens or mixing with coal tar. In addition, residuals which are not reinserted into coke ovens or otherwise excluded from RCRA regulations would be subject to RCRA Subtitle C regulations. Section 2 provides a description of management practices for the wastes proposed for listing as hazardous from the point of generation to the point of reinsertion into coke ovens or mixing with coal tar.

The recycling of wastes from this industry is affected by the combined promulgation of two major rules. One of them, the Toxicity Characteristic, was promulgated on March 29, 1990. The other, the Boiler and Industrial Furnace rule, was promulgated on February 21, 1991. Because these rules were promulgated before this listing (with its attached exclusions) could become effective, the Agency is proposing a set of exclusions (§ 261.4(a)(10), (11), and (12)) for wastes from the coke by-products industry that are recycled. These exclusions will be discussed in section 6.

#### 1. Classifications as a Solid Waste

The definition of solid waste (40 CFR 261.2) states that certain secondary materials, when used as or to produce a fuel, are solid waste (see 40 CFR 261.2(c)(2)(i)(B)). The regulations also state that materials which are reused as ingredients in an industrial process or as substitutes for commercial products are *not* solid wastes; however, those used in production of a "fuel" are considered to be solid wastes (see § 261.2(e)(2)(ii)). Waste-derived coke and coal tar are considered by-products for regulatory purposes and are sometimes burned, albeit not exclusively, or necessarily, for energy recovery. Since some energy recovery ultimately occurs, they are considered solid wastes under the current classification scheme.

#### 2. Rationale for Exclusions from the Definition of Solid Waste for Coke By-Products Residuals Recycled to the Coke Oven or when Mixed with Coal Tar

The residuals being proposed for listing as hazardous when recycled into the coke ovens act as feedstock to the process, providing a source of carbon that is needed for the manufacture of coke. Although the iron and steel industry generally uses only small volumes of residuals with respect to the amount of coal used, the Agency believes that the practice of reinserting these residuals into coke ovens serves to replace the raw material (*i.e.*, coal). Similarly, the practice of mixing the proposed residuals with coal tar prior to its sale or refining constitutes replacing a product (*i.e.*, coal tar). The Agency has concluded that the quality of coke (*i.e.*, levels of hazardous constituents) produced is unaffected by the use of mixtures of the residuals and coal as a feedstock as typically practiced by the industry. Similarly, EPA believes that the quality of coal tar is unaffected by mixing certain wastes with coal tar prior to its sale or refining as typically practiced by the industry (see 50 FR 49170, November 29, 1985 and 56 FR 7203, February 21, 1991.) For these reasons, the Agency believes that reinsertion of these residuals into coke ovens and mixing of these residuals with coal tar to be sold as a product are recycling practices that do not increase the levels of hazardous constituents in the final coke by-product, and therefore do not pose any significantly increased risk to human health and the environment.

EPA has evaluated whether concentrations of toxic constituents in the residuals were likely to have a significant effect on the products of the recycling processes as compared with the products derived solely from raw materials (*i.e.*, coal that is feedstock for coke ovens and coal tar that is feedstock for tar refining). This evaluation was performed by using the results and supporting data considered in developing the Agency's exclusion of coke and coal tar produced from or containing recycled tar decanter sludge (EPA Hazardous Waste No. K087) from the definition of solid waste. This exclusion was based on the Agency's findings that: (1) The recycle of tar decanter sludge by application to the coal charge does not appear to have a significant effect on the chemical make-up of coke, (2) the organic chemical make-up of the sludge does not appear to be significantly different from the coal tar, and (3) although the

concentration of one metal, lead, appears to be slightly higher in the sludge than in the coal tar, the increase does not appear to be statistically significant. EPA, therefore, has determined that recycling of EPA Hazardous Waste No. K087 does not significantly affect the concentrations of toxic metals and organic constituents in coal tar or coke. Based on this determination and on the fact that coke, coal tar, and sludge arise from a single process, are similar materials, and contain the same contaminants, EPA had excluded coke and coal tar containing or produced from K087 (see 56 FR 7202-7203, February 21, 1991).

Since EPA does not have analytical data for coke or coal tar produced from feed containing the wastes being proposed for listing, the Agency's approach for evaluating these wastes was to compare the concentrations of the hazardous organic constituents in these wastes with the same constituents in EPA Hazardous Waste No. K087. In performing this comparative analysis, the Agency used data available for K087 that demonstrates the effects of using recycled materials on quality of coke and coal tar produced. The Agency believes the same results would also apply to wastes that are recycled in the same manner, are physically similar to K087, and have concentrations of hazardous constituents similar or lower than the concentrations of these constituents in EPA Hazardous Waste No. K087. In general, EPA found that typical concentrations of the constituents of regulatory concern in the wastes (*i.e.*, organic constituents) proposed for listing were similar to or lower than the concentrations of the same constituents in EPA Hazardous Waste No. K087. These results are summarized in the Background Document to this proposal. The Agency's general understanding of the process would indicate that the levels of toxic metals would not increase from K087 to the other wastes proposed for listing today.

### 3. Descriptions of Management Practices for the Wastes Proposed for Listing as Hazardous from the Point of Generation to the Point of Reinsertion into Coke Ovens or Mixing with Coal Tar

For the purposes of determining and clarifying at what point the recycling exclusions apply, the Agency is describing existing practices in the coke by-products industry. (These practices apply to K087 wastes as well as to the wastes proposed in today's notice.) The Agency considered the reclamation process involved, the manner in which these residuals are handled, the

transportation methods employed (*i.e.*, mechanisms used to transport the residuals from the point of generation to the point of their recycling), and any intermittent storage that takes place. The waste management practices are discussed below. Since, up to the point of reinsertion, the listed materials are solid and hazardous waste, the requirements of § 261.6(a)(1), (b), and (c) apply. See part 5 of this section and section 1.F of today's proposal.

The Agency considered excluding the wastes proposed for listing from the definition of solid waste when destined for recycling, rather than when reinserted. The rationale for this was based on interpretations of certain court decisions as whether or not materials were part of the waste disposal problem. However, due to concerns about hazardous constituents in the waste as well as real and potential waste mismanagement scenarios (particularly placement on the land), the Agency tentatively prefers the option of excluding these wastes only at the point of reinsertion into the coke ovens or mixing with crude coal tar.

#### *a. Management Practices for Residuals From Their Point of Generation to the Point of Reinsertion Into Coke Ovens.—* *(i) Conveyance to Storage or Blending Unit*

Based on the information available to EPA, the transportation of these residuals from their point of generation to the storage or blending site typically takes place in trucks or hopper cars. Facilities involved in recycling these residuals transport them to the blending site or store them in tanks (see 40 CFR 260.10 for EPA's definition of tanks). Hopper cars or trucks are currently used to transport these residuals from the point of generation to the point of reinsertion into coke ovens or mixing with coal tar. Interim management practices include storage of these residuals and mixing with coal. Wastes recycled on site may be stored up to 90 days without a permit.

To comply with Land Disposal Restrictions (LDR, 40 CFR Part 268), many facilities have had to discontinue putting K087 wastes on the ground, in a pit, or on a low-walled concrete pad in order to mix these wastes with coal. Instead, these wastes are managed in a unit such as a tank to accommodate K087 (and other) wastes. The Agency believes that recycling the proposed wastes will cause minimal extra requirements to construct recycling equipment over and above what already exists, and solicits comment on this point.

Some of the wastes proposed for listing may also be transported from one facility to another (in particular, K147 and K148). Such transportation may occur across a property boundary of adjacent facilities or over several hundred miles and across state lines. The Agency requires a manifest to ensure proper transport and delivery of these hazardous wastes prior to recycling. In addition, storage of wastes received from another facility may require a permit.

#### *(ii) Blending of Residuals With Coal*

The blending of these residuals with a portion of the coal feed is typically practiced to make the recyclable material physically similar to the coal feed (*i.e.*, to give the feedstock-blend a solid consistency as opposed to the semisolid form in which some of the residuals are generated). Based on the limited information available to the Agency, a homogenizing agent may also be used in some cases in the blending process. In a limited number of cases, earthmoving equipment is used for mixing these residuals with coal. In other cases, ball milling of the residuals is required to make a homogeneous mixture with the coal feed. Most of the processing steps involved in preparing the residual/coal mixture are carried out to avoid "hot spots" in the coke oven, operational problems that may be encountered, and any long term damage to the coke oven as a result of using these residuals as a part of the feedstock. However, the recycling process is typically carried out in a way such that the quality of coke manufactured is unaffected. The residual mixture thus prepared is then usually transported to the coal feed site.

#### *(iii) Feeding the Coke Oven*

Typically, the residual mixture is put on the conveyor that feeds the coke oven, or it is sprayed on the coal as it ascends a conveyor belt. In many cases, the residual mixture is heated before it is combined with the main coal feed to ensure an even feed mix and easier material handling. It should be noted that the residual mixture would be a hazardous waste before it is fed to the coke oven.

*b. Management Practices for Residuals Proposed for Listing as Hazardous Prior to Blending with Crude Coal Tar.* Today's proposed residuals would be solid and hazardous wastes subject to RCRA subtitle C regulations prior to their mixing with the crude coal tar and subsequently sold as a product. The coal tar itself is subsequently refined into tar, pitch, or creosote. The

management practices for these residuals prior to blending with coal tar are similar to the management practices described above for residuals mixed with coal to be fed to the coke oven. Some of the proposed residuals are sent to ball mills to produce a uniform material before they are mixed with coal tar. The proposed exclusion under 40 CFR 261.4(a)(11) would only exempt the residuals proposed for listing as hazardous at the point where blending with crude coal tar occurs.

#### 4. Similar Exclusion for Decanter Tank Tar Sludge (K087) When Reinserted Into Coke Ovens or Blended with Coal Tar

EPA also proposes today to modify slightly this same exclusion for decanter tank tar sludge (EPA Hazardous Waste No. K087) when it is reinserted into coke ovens. Coke and coal tar containing decanter tank tar sludge currently are excluded from regulation as a hazardous waste under 40 CFR 261.4(a)(10) when used as a fuel. The exclusion classifies mixtures of the waste and coal tar, and coke derived from such mixtures, as products rather than wastes. However, other by-products, such as light oil recovered from coke oven gas generated by coke ovens charged with mixtures of coal and the waste, would have been hazardous wastes without the exclusion because of the "derived from" rule. Therefore, EPA excluded decanter tank tar sludge from the definition of solid waste at the point of reinsertion into coke ovens.

In addition, the wording of the exclusion in § 261.4(a)(10) is being corrected to delete the phrase "when used as a fuel." The Agency has found that inclusion of this phrase in the regulations will lead to confusion as to the scope of the exclusion, since coal tar is not generally used as a fuel (although it has high fuel value).

#### 5. Generator Requirements

Generators should note that, under 40 CFR 261.6(a)(1), hazardous wastes that are recycled are subject to the requirements for generators, transporters, and storage facilities of paragraphs (b) and (c) of that section, except for materials listed in (a)(2) and (a)(3) of that section. Under 40 CFR 261.6(b), generators and transporters of recyclable materials are subject to the applicable requirements of parts 262 and 263, and notification requirements under section 3010 of RCRA, except for materials listed in (a)(2) and (a)(3) of that section.

Under 40 CFR 261.6(c)(1), owners or operators of facilities that store recyclable materials before they are recycled are regulated under all

applicable provisions of subparts A through L of parts 264 and 265, and under Parts 124, 266, 268, and 270, and the notification requirements under section 3010 of RCRA, except as provided in paragraph (a) of that section. Under 40 CFR 261.6(c)(2), owners or operators of facilities that recycle materials without storing them before they are recycled are subject to the following requirements, except as provided in paragraph (a) of that section:

(i) Notification requirements under section 3010 of RCRA.

(ii) Section 265.71 and 265.72 (dealing with the use of a manifest system and manifest discrepancies).

#### 6. Other Options

Recognizing the significant role recycling plays in this industry, and the implications of the definition of solid waste and RCRA Subtitle C regulations, the Agency has considered various options in designing a regulatory structure to allow recycling of certain coke by-products wastes. The options considered are oriented around: 1) whether or not to facilitate the recycling, 2) at what point would the wastes be outside the scope of RCRA regulation, and 3) an exclusion for wastes which exhibit the newly-promulgated Toxicity Characteristic (TC).

On March 29, 1990, the Agency promulgated the amended Toxicity Characteristic rule (55 FR 11798). The Agency believes that many of the wastes proposed to be listed as hazardous in today's rule already may be hazardous wastes because they contain levels of organic constituents (e.g., benzene) in excess of levels of these constituents published in the Toxicity Characteristic rule. Since these wastes may already be hazardous, recycling the wastes into the coke oven may also subject coke ovens to the strict management standards of the Boiler and Industrial Furnace rule mentioned above, unless an exclusion from the Definition of Solid Waste as described in this section were also effective.

In the period of time between the promulgation of the Boiler and Industrial Furnace rule and the K141-K145, K147, and K148 listings, recycling of these wastes would be discouraged if they are TC hazardous. As explained in Section I.1 of this proposal, any hazardous waste (listed or characteristic) that is used as a fuel or to make a fuel is still considered a solid waste. Therefore, the Agency is proposing (here and in a separate rulemaking) an exclusion from the definition of solid waste for characteristically hazardous wastes generated at coke by-products

manufacturing facilities that are recycled into the coke oven (40 CFR 261.4(a)(12)). Those wastes which fail the TC for benzene and are recycled into the coke oven (as described above in this section) will not be considered solid wastes at the point they are inserted into the coke oven. The Agency is not proposing to limit the scope of the exclusion to wastes which fail the TC for organic chemicals only. Since natural coal contains inorganic constituents, limiting the proposal only to organics would be anomalous.

The Agency notes that if the wastes proposed for listing today are TC hazardous for benzene, and they are mixed with K087 wastes prior to recycling into the coke ovens, the entire mixture would assume the K087 listing. Since under 40 CFR 268.43, K087 waste already has a treatment standard for benzene, no additional notification for TC hazardous wastes is required for the combined wastes. (This classification scheme is clarified in the technical corrections to the Third Third rule at 56 FR 3872, January 31, 1991.) The Agency will still promulgate the exclusions for recycled TC hazardous wastes at coking facilities in order not to cause confusion among the regulated community, and to avoid any difficulties for facilities that find prior mixing of these wastes with K087 is not always possible.

The Agency is also considering options other than the ones presented in the description of management practices. Some of these options may be addressed by commenters as to the specifics of recycling practices (see requests under "Conclusions" in this section). The Agency is also considering whether to exclude or exempt those wastes from this industry that are destined for recycling, as long as these wastes do not touch the ground or are placed on land. Specifically, the Agency is concerned with: (1) transportation of the wastes from one point to another (whether on one plant site or from one site to another), (2) what sort of facilities for handling the wastes could keep the wastes qualified for this exclusion (particularly in light of the recently promulgated land disposal restrictions regulations in 40 CFR part 268), (3) what alternatives may exist for specific waste streams if the wastes are chemically incompatible with the process equipment or with each other, (4) the legal jurisdiction the Agency has over the wastes at various points in the process, and (5) the extent of closed-loop recycling that takes place at coke by-products facilities.



## 7 Conclusions

In conclusion, the practice of reinserting these residuals (proposed K141 through K145, K147, and K148) back into the coke ovens serves to replace the raw material, coal, and the practice of mixing these residuals with coal tar serves to replace the product, coal tar. The practice, based on available information, seems to pose no additional hazard to human health and the environment. Therefore, the Agency is proposing to exclude these residuals when reinserted into the coke ovens or when mixed with product coal tar from the definition of solid waste under 40 CFR 261.4(a) (10), (11), and (12).

EPA recognizes that certain common management practices for coke by-products wastes may present a threat to human health and the environment. Even in cases where the wastes are recycled, some of the management steps prior to recycling could provide opportunity for the release of hazardous materials. As such, the proposed listing and recycling exclusions have been developed to require that the wastes be handled in accordance with subtitle C regulations after generation and up to the point of recycling.

The Agency notes that waste management practices are subject to change as new technologies are developed, economic incentives change, or as the Agency publishes other regulatory programs. Specifically, new regulations under the Clean Air Act (National Emissions Standards for hazardous Air Pollutants, or NESHAPs) published in September 1989 and March 1990 affect the coke by-products industry, and may have a direct effect on industrial operations and waste management practices. The Agency believes that compliance with NESHAP regulations will further reduce the potential for hazardous constituent releases into the environment; however, the Agency requests comment on this particular postulation. Given the fact that several of the wastes contain constituents of relatively high molecular

weight, EPA does not expect that mixing of the proposed wastes with coal tar would contribute to increased benzene emissions for the most part. Depending on the location of tar refining, storage, and mixing operations, the NESHAP regulations may apply to the mixing of coal tar with the wastes proposed in today's notice at certain facilities. However, the exclusions from the definition of solid waste will mean that facilities will not be subject to RCRA air rules (sections 264 and 265, subparts AA and BB) when mixing wastes with coal tar or reinserting wastes into the coke oven.

The February 21, 1991 Boiler and Industrial Furnace rule concluded that the sludge recycling does not affect the amount of toxic constituents in coke or coal tar, or emissions from their manufacturing processes. Furthermore, management of the wastes in question does not contribute to the waste disposal problem, rendering the regulation of coke and coal tar as RCRA solid wastes unnecessary. Additionally, the process of making coke and coal tar from K087, K060, K141-K145, K147, and K148 need not be subject to RCRA control. Since making coke and mixing coal tar are subject to special criteria under the Clean Air Act, RCRA regulation of some of these practices may be disruptive and inappropriate to the CAA regulatory scheme. As described above, the K087, K060, K141-K145, K147, and K148 wastes are subject to full RCRA regulation prior to entering the recycling process. Exclusions would not apply to the coking or coal tar producing process if other hazardous wastes (e.g., spent solvents) are mixed into the process. (See 56 FR 7203.)

EPA requests comment on its decision to exclude the proposed residuals when reinserted into coke ovens or mixed with coal tar product from the definition of solid waste under 40 CFR 261.4(a) (10), (11), and (12). Comments and data on the extent and nature of recycling and reclamation practices of these wastes, and the relationship of these

practices to the definition of solid waste are requested. Specific information on the following is requested: the length of time over which residuals accumulate; the manner in which they are returned to the process; the chemical compatibility of the wastes with the industrial process and with each other; the percentage of material recycled or reclaimed; the ability of the materials in question to be wastes under some circumstances and products in others; whether the recycling or reclamation takes place continuously; and, any other relevant information or data on the recycling or reclamation of these wastes.

### F. Proposal Not To List Coke By-Products Wastewaters

EPA is not proposing to list coke by-products wastewaters as hazardous wastes. This decision is based on the Agency's expectation that at least some of the wastewater streams at coke by-products facilities may fail the TC test for benzene. EPA, therefore, expects that such wastewaters could be effectively regulated under the TC rule. In particular, final cooler blowdown and wastewaters from light oil recovery contain benzene levels ranging from 0.44 to 140 ppm. Table 10 presents the ranges of concentrations found for the hazardous constituents present in these wastewaters. EPA found that out of twelve samples, seven analyzed by EPA had benzene levels higher than the promulgated TC level of 0.5 ppm. Therefore, these wastes are now regulated Subtitle C wastes because they are characteristically hazardous. As shown in Table 10, wastewaters do not typically and frequently contain PAHs at quantifiable levels of regulatory concern. The Agency notes that if the wastes proposed for listing in today's notice (or any other listed hazardous waste) were to be deliberately mixed with coke by-product wastewaters, the mixture would become a hazardous waste pursuant to the mixture rule in 40 CFR 261.3(a)(2)(iv).

TABLE 10.—COKE BY-PRODUCTS PLANT WASTEWATERS

Constituent of concern	Health-based water concentration limits (ppm)	Basis <sup>1</sup>	IC regulatory level <sup>2</sup> (ppm)	Coke by-products wastewater concentrations (ppm) <sup>3</sup>											
				Waste ammonia liquor			Final cooler blowdown			Light oil recovery wastewater			Mixed coke plant wastewaters		
				Range	No. of data points	Average	Range	No. of data points	Average	Range	No. of data points	Average	Range	No. of data points	Average
Benzene	$5.0 \times 10^{-3}$	HCL	0.5	<0.002	2	0.001	0.44-38	4	16	23-86	4	47	0.1-0.3	2	0.2
Benz(a)anthracene	$1.1 \times 10^{-6}$	RSD (Class B <sub>2</sub> )	NA	<0.05-0.32	2	<0.17	<0.14-0.11	3	0.09	ND-1.2	4	0.43	<0.04-<0.06	2	0.03
Benz(a)pyrene	$3.0 \times 10^{-6}$	RSD (Class B <sub>2</sub> )	NA	<0.05-0.21	2	0.12	ND-0.083	3	0.03	ND-<1	4	0.1	ND-<0.06	1	0.02

TABLE 10.—COKE BY-PRODUCTS PLANT WASTEWATERS—Continued

Constituent of concern	Health-based water concentration limits (ppm)	Basis <sup>1</sup>	IC regulatory level <sup>2</sup> (ppm)	Coke by-products wastewater concentrations (ppm) <sup>3</sup>											
				Waste ammonia liquor			Final cooler blowdown			Light oil recovery wastewater			Mixed coke plant wastewaters		
				Range	No. of data points	Average	Range	No. of data points	Average	Range	No. of data points	Average	Range	No. of data points	Average
Benzo(b and k)fluoranthene	$4.0 \times 10^{-4}$	RSD (Class B <sub>1</sub> )	NA	<0.05-0.36	2	0.19	ND	2	ND	ND-<1	2	0.25	ND-<0.06	2	0.02
Dibenz(a,h)anthracene	$7.1 \times 10^{-7}$	RSD (Class B <sub>1</sub> )	NA	ND-<0.1	2	0.03	ND	2	ND	ND-<2.5	2	0.63	ND	2	ND

Source: Background Document.

<sup>1</sup> MCL—Maximum Contaminant Level.

<sup>2</sup> RSD—Risk Specific Dose—Toxicity Characteristic (TC) levels were promulgated on March 29, 1990 (See 55 FR 11798-11862).

<sup>3</sup> RSD—Risk Specific Dose— = Not Reported.

ND = Not Detected.

< = Detected but not quantifiable.

Pursuant to 40 CFR 261.11(a)(1) the Agency could have listed other wastewater streams from coke by-products plants (e.g., final cooler blowdown and wastewaters from light oil recovery) on the basis of the concentrations of benzene present in these waste streams. However, the Agency has currently decided not to list them and considers their regulation by the promulgated TC rule to be sufficiently protective of human health and the environment (for details on the TC rule, see 55 FR 11798-11862).

EPA does not have analytical data on the concentrations of benzene and other hazardous constituents of concern in sludges generated from the treatment of coke by-product wastewaters. However, since concentrations of most of these constituents in wastewaters with the exception of benzene are not typically and frequently present at levels of regulatory concern, the Agency does not believe that listing of sludges is warranted.

#### G. Impact of Future Land Disposal Restrictions (LDR) Determinations

The Hazardous and Solid Waste Amendments of 1984 (HSWA) impose substantial new responsibilities on those who handle hazardous waste. HSWA prohibits, in particular, the continued placement of hazardous waste in or on the land unless the Agency makes the determination that the prohibition is not required to protect human health and environment for as long as the waste remains hazardous. Land disposal of these wastes is only allowed if the wastes meet treatment standards promulgated by the Agency. These standards must substantially reduce the toxicity of or the likelihood of migration of hazardous constituents from the wastes. The statute also established a rigorous schedule for making determinations regarding the continued land disposal of these wastes. This schedule placed special emphasis

on all hazardous wastes that were identified prior to the enactment of HSWA (November 8, 1984).

The Agency is also required to make a land disposal prohibition determination for any hazardous waste that is newly identified or listed in 40 CFR Part 261 after November 8, 1984, within six months of the date of identification or effective date of listing (section 3004(g)(4), 42 U.S.C. 6924(g)(4)). Once promulgated, the coke by-products wastes being proposed in today's rule would, therefore, be subject to this requirement.

This section of today's preamble addresses activities EPA is planning to perform in order to comply with the mandatory requirements to develop land disposal restrictions for coke by-products wastes. The Agency is requesting comments and information in the areas of pollution prevention, recycling, treatment, and treatment capacity for these wastes.

#### 1. Request for Comment on the Agency's Approach to Pollution Prevention in the LDR Program

EPA has made considerable progress over the years in improving environmental quality through its media-specific pollution control programs. Standard practice in several industries, however, has relied traditionally on land disposal of solid wastes, including those residuals generated from the control of air and water emissions. Treatment of many of these wastes was primarily motivated by industry's desire to reduce liability and costs of disposal. In part to conserve energy, industry began to recycle and burn or otherwise process many wastes as fuel substitutes where such technologies were relatively easy to implement. Elimination or reduction of the generation of these wastes, while instituted by a number of corporations, was typically not a high priority management practice.

This changed dramatically in 1984, as HSWA established a national policy reversing this scheme of priorities that was previously practiced by industry and inadvertently spawned by regulatory efforts. HSWA thus established elimination or reduction of wastes as the first priority for managing all wastes. Recycling and treatment came next in order of priority. While land disposal was established as the least preferred means of managing wastes, it was recognized as necessary for some wastes, provided they were treated prior to disposal.

The Agency intends to gather information on pollution prevention potential wherever feasible and thus is requesting comment on particular opportunities for volume and toxicity reduction for coke by-products wastes. Through cooperative efforts such as these, the Agency can better inform the public and make enlightened decisions on regulatory matters. At the same time, the information collected as a response to today's notice can be assembled, evaluated, and potentially disseminated through the Agency's technology transfer program potentially resulting in short-term positive impact on volume reductions. The Agency points out that even if the listing of these wastes is not promulgated, the pollution prevention ideas gathered from this notice can still be very useful to regulatory agencies, industry, and to the public.

Successful reduction in waste generation is often erroneously interpreted by industry to result only from complex and/or expensive process changes. Often there are relatively simple engineering solutions that can be easily implemented that will achieve this goal. Evaluation of adherence to existing process control measures along with slight modifications of these can often result in significant volume reduction. These evaluations may also point out the need for more complex

engineering evaluations (e.g., mixing effectiveness, process temperatures and pressures, and mutual compatibility of wastes). Simple physical audits of current waste generation and in-plant management practices for the wastes can also yield very positive results. These audits often turn up simple non-engineering practices that can be successfully implemented. They may point out the need for the repair/replacement of leaking pipes, valves, and simple equipment, or may result in modification of inspection and maintenance schedules.

The likelihood exists that pollution prevention opportunities for the manufacturing processes generating the wastes proposed in today's notice may potentially result in significant reductions in waste generation and, thus, considerable cost-savings for industry. The Agency is interested in comments and data on such opportunities, including both successful and unsuccessful attempts to reduce waste generation, as well as the potential for volume or toxicity reductions. It is also possible that, due to previous implementation of waste minimization procedures, some facilities or specific processes have very little potential for decreases in waste generation rates or toxicity. The Agency is particularly interested in specific information such as: (1) Data on the quantities of wastes that have been or could be reduced; (2) a means of calculating percent reductions that are achievable (accounting for changes in production rates); (3) potential for reduction in toxicity of the wastes; (4) the results of waste audits that have been performed; (5) capacity for recycling the wastes to the coke oven (or another part of the process); and (6) potential cost savings that can be (or have been) achieved.

In the case of wastes generated by the coke by-products industry, the Agency has some information concerning waste recycling practices, as discussed in the previous section of this preamble. EPA has collected this information as a result of other rulemaking efforts, such as the Boiler and Industrial Furnaces Rule, and is, in fact, proposing exclusions from the definition of solid waste for certain wastes as they are recycled. Any additional information provided by commenters will greatly ameliorate the Agency's ability to take into account past and present waste management practices for the purposes of LDR.

## 2. Request for Comment on the Agency's Approach to the Development of BDAT Treatment Standards

While the Agency prefers source reduction/pollution prevention and recycling/recovery over conventional treatment, inevitably some wastes (such as residues from recycling and inadvertent spill residues) will be generated. Thus, standards based on treatment using Best Demonstrated Available Technology (BDAT) will be required to be developed, at a minimum, for these wastes. (Note: The Agency does recognize there may be some special situations where the generation of a particular waste can be totally eliminated. This is unlikely, however, for most wastes.)

A general overview of the Agency's approach in performing analysis of BDAT for hazardous wastes can be found in Section III.A.1 of the preamble to the final rule for Third Third wastes (55 FR 22535—22542, June 1, 1990). If all or part of the proposed listing of the coke by-product wastes is promulgated in a later rulemaking, the Agency may develop BDAT treatment standards for these wastes based on the transfer of performance data from the treatment of wastes (such as K087) with similar chemical and physical characteristics or similar concentrations of hazardous constituents. Treatment standards will be established for these wastes on a constituent-specific basis, with the regulated constituents selected based on their presence in the untreated wastes. These constituents are not necessarily limited to the hazardous constituents of concern (proposed for 40 CFR part 261 appendix VII) identified as present in the wastes in today's rule.

The technologies required by and those forming the basis of the treatment standards, in general, are determined by whether the wastes contain organics and/or metals. For wastes such as the ones proposed in today's notice containing primarily organics, the Agency has found that incineration and other thermal destruction techniques can destroy most organics to concentrations at or near the limit of detection as measured in the ash residues. Many people, however, are apprehensive about incineration of hazardous wastes and prefer the use of alternative treatment technologies for wastes that must be treated. While the Agency believes that incineration and other thermal destruction technologies achieve a level of relatively complete destruction for the organics, it typically establishes concentration-based standards based on these data rather than requiring the wastes to be

incinerated. Thus, any alternative technologies that can achieve these levels may be used. In fact, where alternative treatment technologies cannot achieve these levels, but achieve reasonably comparable results, the Agency may promulgate adjusted treatment standards achievable by both incineration and the alternative technologies.

As stated above, the Agency has extensive information that the coking industry recycles many of its wastes by reinjecting them into the coke ovens. Because of this practice, the likelihood exists that this practice will be proposed as the BDAT for treatment of these wastes.

Thus, the Agency is soliciting or updating data and information on appropriate treatment technologies for the wastes proposed in today's rule. Information should include, but not be limited to, the following: (1) Technical descriptions of the treatment systems that are currently used for these wastes; (2) descriptions of alternative technologies that might be currently available or anticipated as applicable; (3) performance data for the treatment of these wastes (in particular, constituent concentrations in both treated and untreated wastes, as well as equipment design and operating conditions); (4) information on known or perceived difficulties in analyzing treatment residues or specific constituents; and (5) quality assurance/control information for all data submissions.

## 3. Request for Comment on the Agency's Approach to the Analyses of BDAT Treatment Capacity

In today's notice, the Agency is proposing to list coke by-product wastes as hazardous under 40 CFR 261.32. Although data on waste characteristics and current management practices have been gathered for the purpose of listing the wastes, the Agency has not evaluated these data for the purposes of developing specific BDAT treatment standards or assessing the capacity to treat (or recycle) these wastes. As a result, we are soliciting comments on the completeness of the existing data (which can be found in the RCRA docket) and requesting additional data and information with respect to treatment and capacity.

The Agency is particularly interested in updating the following information about the proposed wastes (identified by the proposed waste codes): (1) The total quantities of each waste generated; (2) the quantities (on-site and off-site) stored, treated, recycled, or disposed



(and types of units) with particular emphasis on those managed in units designated as land disposal under HSWA (Note: Besides landfills, this also includes underground injection units, surface impoundments, land treatment, and waste piles); (3) the treatability group classifications of the wastes (*i.e.*, wastewaters or nonwastewaters as defined in the Third Third rule); (4) the chemical/physical characteristics of the wastes, including information such as total organic carbon content, BTU value, concentration of organic and metal constituents, etc.; and (5) specific chemical composition or physical form of the waste that could potentially interfere or otherwise limit the application of specific treatment or recycling technologies and thus would impact EPA's analysis of capacity.

The Agency also needs additional data on the number of facilities and volume of wastes currently regulated under other regulations (*e.g.*, the Clean Water Act or the Clean Air Act), along with State or local waste management requirements. EPA needs to evaluate the impact of shifting these wastes from land disposal to on-site, captive, and commercial treatment or recycling capacity. The Agency is also soliciting comment on the viability of treating or recycling these wastes at commercial treatment and/or recycling facilities. It is particularly important that short-term and long-term trends (including potential capacity shortfalls) be identified, especially for new treatment and for recycling technologies. Finally, it is important to have this information provided on a facility-specific basis in order to address the impacts of the land disposal restrictions program on the regulated community.

### III. State Authority

#### A. Applicability of Rules in States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce RCRA programs within the State. (See 40 CFR part 271 for the standards and requirements for authorization.) Following authorization, EPA retains enforcement authority under sections 3008, 7003, and 3013 of RCRA, although authorized States have primary enforcement responsibility.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final RCRA authorization administered its authorized hazardous waste program entirely in lieu of EPA. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities in the State which the State was authorized to permit. When new, more-

stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under section 3006(g) of RCRA (42 U.S.C. 6926(g)), new requirements and prohibitions imposed by the HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. EPA is directed to implement these requirements and prohibitions in authorized States, including the issuance of permits, until the State modifies its program to reflect the Federal standards, and applies for and is granted authorization. While States must still adopt HSWA-related provisions as State law to retain final authorization, HSWA applies in authorized States in the interim.

Today's proposal for listing EPA Hazardous Waste Nos. K141 through K145, K147, and K148 is being proposed pursuant to section 3001(e)(2) of RCRA, a provision added by HSWA. When the final rules are promulgated, EPA will consider its HSWA obligation to make a determination regarding listing coke by-products wastes to be fulfilled. Therefore, the Agency is proposing to add these requirements to Table 1 in 40 CFR 271.1(j), which identifies the Federal program requirements that are promulgated pursuant to HSWA and that take effect in all States, regardless of their authorization status. States may apply for either interim or final authorization for the HSWA provisions identified in 40 CFR 271.1(j) table 1, as discussed in the following section of the preamble.

#### B. Effect on State Authorizations

As noted previously, today's rule is being proposed pursuant to provisions added by HSWA. The addition of K141 through K145, K147, and K148 to the list of hazardous wastes from specific sources is proposed pursuant to section 3001(e)(2) of RCRA, a provision added by HSWA.

As noted above, EPA will implement the HSWA portions of today's rule (*i.e.*, the addition of K141 through K145, K147, and K148 to the list of hazardous wastes from specific sources) in authorized States until they modify their programs to adopt these rules and such modifications are approved by EPA. Because this rule will be promulgated pursuant to HSWA, a State submitting a program modification may apply to receive either interim or final RCRA authorization under section 3006(g)(2) or 3006(b), respectively, on the basis that

State regulations are substantially equivalent or fully equivalent to EPA's regulations. The procedures and schedule for State program modifications for either interim or final authorization are described in 40 CFR 271.21. It should be noted that all HSWA interim authorizations will expire on January 1, 1993 (see 40 CFR 271.24(c)).

It should be noted that 40 CFR 271.21(e) requires that States having final RCRA authorization must modify their programs to reflect Federal program changes and must subsequently submit the modifications to EPA for approval. The deadline by which States must modify their programs to adopt today's proposed rule will be determined by the date of promulgation of the final rule in accordance with 40 CFR 271.21(e)(2). Once EPA approves the modification, the State requirements become RCRA subtitle C requirements.

States with authorized RCRA programs may already have regulations similar to those proposed in today's rule. Such State regulations have not been assessed against the Federal regulations being proposed today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement its regulations as RCRA requirements until the State program modification is submitted to EPA and approved. Of course, States with existing regulations may continue to administer and enforce those regulations as a matter of State law. In addition, in implementing the Federal program, EPA will work with the States under cooperative agreements to minimize duplication of efforts; in many cases, EPA will be able to defer to the States in their efforts to implement their programs, rather than take separate actions under Federal authority.

States that submit their official applications for final authorization less than 12 months after the effective date of EPA's regulations are not required to include regulations equivalent to the EPA regulations in their application. However, States must modify their programs by the deadlines set forth in 40 CFR 271.21(e). States that submit official applications for final authorization 12 months after the effective date of these standards must include standards equivalent to these standards in their application. The requirements States must meet when submitting final authorization applications are set forth in 40 CFR 271.3.

### IV. CERCLA Designation and RQ Adjustment

Pursuant to section 101(14)(C) of the Comprehensive Environmental

US EPA ARCHIVE DOCUMENT

Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, the wastes proposed to be listed as hazardous in today's notice will, on the effective date of the final rule, automatically become hazardous substances under CERCLA by virtue of their listing under RCRA. The CERCLA hazardous substances are listed in Table 302.4 at 40 CFR 302.4 along with their reportable quantities (RQs). CERCLA section 103(a) requires that persons in charge of vessels or facilities from which a hazardous substance has been released in a quantity that is equal to or greater than its RQ shall immediately notify the National Response Center of the release at (800) 424-8802 or at (202) 426-2675. In addition, section 304 of the Superfund Amendments and Reauthorization Act of 1986 (SARA) requires the owners or operator of a facility to report the release of a CERCLA hazardous substance or an extremely hazardous substance to the appropriate State emergency response commission (SERC) and to the local emergency planning committee (LEPC) when the amount released equals or exceeds the RQ for the substance or one pound where no RQ has been set.

The release of a hazardous waste to the environment must be reported when the amount released equals or exceeds

the RQ for the waste, unless the concentrations of the constituents of the waste are known (48 FR 23566, May 25, 1983). If the concentrations of the constituents of the waste are known, then the mixture rule may be applied. According to the "mixture rule" developed in connection with the Clean Water Act Section 311 regulations (40 CFR 302.6(b)) and also used in notification under CERCLA and SARA (50 FR 13463, April 4, 1985 and amended on August 14, 1989, 54 FR 33481), the release of mixtures or solutions (including hazardous waste streams) of hazardous substances would need to be reported to the NRC, and to the SERC and LEPC: (1) If the quantity of all of the hazardous constituent(s) of the mixture or solution is known, when an RQ or more of any hazardous constituent is released, or (2) if the quantity of one or more of the hazardous constituent(s) of the mixture or solution is unknown, when the total amount of the mixture or solution released equals or exceeds the RQ for the hazardous constituent with the lowest RQ. RQs of different hazardous substances are not additive under the mixture rule, so that spilling a mixture containing half an RQ of one hazardous substance and half an RQ of another hazardous substance need not be reported.

Under section 102(b) of CERCLA, all hazardous wastes newly designated under RCRA will have a statutorily-imposed RQ of one pound unless and until adjusted by regulation under CERCLA. In order to coordinate the RCRA and CERCLA rulemaking with respect to new waste listings, the Agency today is proposing regulatory amendments under CERCLA authority in connection with the proposed listing of wastes K141, K142, K143, K144, K145, K147, and K148. The Agency is proposing to: (1) Designate wastes K141, K142, K143, K144, K145, K147, and K148 as hazardous substances under section 102(a) of CERCLA and (2) adjust the RQs of wastes K141, K142, K143, K144, K145, K147, and K148 to one pound. Releases of a waste stream are reportable if any hazardous constituent of the waste stream is released in a quantity greater than or equal to the RQ for that constituent (50 FR 13463, April 4, 1985). Wastes K141, K142, K143, K144, K145, K147, and K148 each contain one or more hazardous constituents that have a 1-pound RQ; therefore, the RQs of the wastes are also proposed as 1 pound. The RQs for each of the hazardous constituents and the proposed RQs for each waste are identified in Table 11.

TABLE 11.—RQs FOR CONSTITUENTS OF CONCERN FOR WASTES K141–K145, K147, AND K148

Hazardous substance	Constituent	RQ (lbs)
Waste No. K141.....	Benzene .....	1
	Benz(a)anthracene .....	10
	Benzo(a)pyrene .....	10
	Benzo(b)fluoranthene .....	1
	Benzo(k)fluoranthene .....	1
	Dibenz(a,h)anthracene .....	5,000
	Indeno(1,2,3-cd)pyrene .....	1
Waste No. K142.....	Benzene .....	100
	Benz(a)anthracene .....	1
	Benzo(a)pyrene .....	10
	Benzo(b)fluoranthene .....	1
	Benzo(k)fluoranthene .....	1
	Dibenz(a,h)anthracene .....	5,000
	Indeno(1,2,3-cd)pyrene .....	1
Waste No. K143.....	Benzene .....	100
	Benz(a)anthracene .....	1
	Benzo(a)pyrene .....	10
	Benzo(b)fluoranthene .....	1
	Benzo(k)fluoranthene .....	1
Waste No. K144.....	Benzene .....	5,000
	Benz(a)anthracene .....	1
	Benzo(a)pyrene .....	10
	Benzo(b)fluoranthene .....	1
	Benzo(k)fluoranthene .....	1
Waste No. K145.....	Dibenz(a,h)anthracene .....	5,000
	Benzene .....	1
	Benz(a)anthracene .....	1
	Benzo(a)pyrene .....	10
	Dibenz(a,h)anthracene .....	10

TABLE 11.—RQS FOR CONSTITUENTS OF CONCERN FOR WASTES K141–K145, K147, AND K148—Continued

Hazardous substance	Constituent	RQ (lbs)
Waste No. K147	Naphthalene.....	100
	Benzene.....	1
	Benz(a)anthracene.....	10
	Benzo(a)pyrene.....	10
	Benzo(b)fluoranthene.....	1
	Benzo(k)fluoranthene.....	1
	Dibenzo(a,h)anthracene.....	5,000
Waste No. K148	Indeno(1,2,3-cd)pyrene.....	1
	Benz(a)anthracene.....	100
	Benzo(a)pyrene.....	1
	Benzo(b)fluoranthene.....	1
	Benzo(k)fluoranthene.....	1
	Dibenzo(a,h)anthracene.....	5,000
	Indeno(1,2,3-cd)pyrene.....	100

### V. Cost and Economic Analysis

Executive Order No. 12291 requires EPA to prepare an analysis of the costs and economic impacts associated with a proposed regulation. The results of this analysis are used to determine whether the regulation will result in: (1) incremental annual costs that exceed \$100 million, (2) significant increases in costs or prices for consumers or individual industries, or (3) significant adverse effects on competition, employment, investment, innovation, or international trade. If a proposed rule meets any of these criteria, it is a "major rule," as defined by Executive Order No. 12291, and a Regulatory Impact Analysis must be completed before the rule is promulgated.

Today's proposed rule is not a "major" rule because it would not have an annual economic effect of more than \$100 million and would not have significant adverse effects on the coke by-products and tar refining industries. This section of the preamble discusses the results of the cost analyses undertaken to assess the effects of the proposed rule. The draft Cost and Economic Impact Analysis (DPRA, 1990) is available in the public docket for this proposal.

In order to assess the effects of the proposed rule, EPA first identified wastes and facilities which would be affected by the rule. Incremental costs for each facility were estimated based on the changes in waste management practices that would be required once the wastes are regulated as hazardous. The incremental costs for the individual facilities were aggregated to estimate national costs of the rule.

To determine the nationwide costs of the proposed rule, waste quantities, baseline management practices, and compliance management practices for proposed EPA Hazardous Waste Nos.

K141 through K145, K147, and K148 were developed based on the information in RCRA 3007 questionnaires and best engineering judgment. For these wastes, the baseline management practices included recycling of wastes to coke ovens, burning as fuels, and disposal in off-site landfills. The most-costly compliance management practice for all these wastes was assumed to be incineration in a permitted RCRA incinerator.

Incremental costs were calculated by subtracting costs of baseline management practices from costs of management practices if all of the proposed wastes are regulated as hazardous. Management practices were developed for both the least-costly compliance option and most-costly compliance option based on waste types and quantities.

EPA's analysis indicates that the total annualized incremental cost to the industry, excluding regulatory costs for 40 CFR parts 262 and 266, would range from approximately \$150,000 for the least-costly compliance option to \$18 million for the most-costly compliance option. The least costly compliance option involves costs associated with managing today's proposed wastes as hazardous before they are reinserted into the coke oven. Costs involved in this option would result from upgrading existing storage and secondary containment systems, and the transportation of those tar refining wastes that are not currently being recycled to the coke ovens. The most costly compliance option involves incineration of all residuals in RCRA permitted incinerators.

The annualized administrative costs for complying with 40 CFR parts 262 are estimated to be \$52,000, which includes costs for reporting and record keeping. Therefore, even for the most costly

compliance option (*i.e.*, incineration of these wastes) the total annualized incremental cost of this rule is estimated to be less than \$100 million.

Additionally, the Agency's analysis concluded that these costs would not result in significant price increases or significant adverse effects on competition, trade, employment or investment. Therefore, because impacts of the proposed rule do not meet the criteria for major rules set by Executive Order No. 12291, the Agency has determined that today's rule is not a major rule.

### VI. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601–612), whenever an Agency is required to publish a General Notice of Rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis (RFA) that describes the impact of the rule on small entities (*i.e.*, small businesses, small organizations, and small governmental jurisdictions). No RFA is required, however, if the head of the Agency certifies that the rule will not have a significant impact on a substantial number of small entities.

Since EPA has determined the hazardous wastes proposed for listing here are not generated by small entities (as defined by the Regulatory Flexibility Act), and the Agency believes that small entities will not generate them in significant quantities. This regulation, therefore, does not require an RFA. Accordingly, I hereby certify that this regulation will not have a significant economic impact on a substantial number of small entities.

### VII. Paperwork Reduction Act

This rule does not contain any information collection requirements



subject to OMB review under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq.

## VIII. Compliance and Implementation

### A. Section 3010 Notification

Generally, when new hazardous wastes are listed, all persons who generate, transport, treat, store, or dispose the newly listed waste(s) are required to notify either EPA, or a State authorized by EPA to operate the hazardous waste program, of their activities pursuant to section 3010 of RCRA. However, under the Solid Waste Disposal Amendments of 1980 (Pub. L. 96-482), EPA was given the option of waiving the notification requirements under section 3010 of RCRA following revision of the section 3001 regulations, at the discretion of the Administrator. EPA is proposing to waive this notification requirement for persons who handle wastes that are covered by today's proposed listing and have already notified EPA that they manage other hazardous wastes and have received an EPA identification number. This waiver is being proposed because of the likelihood that persons managing today's proposed wastes already are managing one or more hazardous wastes that generally are associated with the generation of proposed EPA Hazardous Waste Nos. K141 through K145, K147, and K148 and have, therefore, previously notified EPA and received an EPA identification number. In the event that any person who generates, transports, treats, stores, or disposes these wastes and has not previously notified and received an identification number, that person must obtain an identification number pursuant to 40 CFR 262.12 before that person can generate, transport, treat, store, or dispose of these wastes.

### B. Compliance Dates for Facilities

Today's proposed listings will be promulgated pursuant to HSWA. HSWA requirements are applicable in authorized States at the same time as in unauthorized States. Therefore, EPA will regulate the wastes being proposed today until States are authorized to regulate these wastes. Once these regulations are promulgated in a final rule by EPA, the Agency will apply these Federal regulations to these wastes and to their management in both authorized and unauthorized States.

Newly regulated facilities (*i.e.*, facilities at which the only hazardous wastes that are managed are today's proposed wastes in units subject to permit requirements when these listings are finalized) must qualify for interim

status within six months of publication of the rule in order to continue managing these wastes in such units. To retain interim status, a newly-regulated land disposal facility must submit a part B permit application within eighteen months after publication of the rule and certify that the facility is in compliance with all applicable ground-water monitoring and financial responsibility requirements (see RCRA section 3005(e)(3)).

Interim status facilities that manage today's proposed wastes after these listings are finalized, must file an amended Part A permit application within six months of publication of the final rule if they are to continue managing these wastes in units that require a permit. The facilities must file the necessary amendments by the effective date of the rule, or they will not retain interim status with respect to today's proposed wastes (*i.e.*, they will be prohibited from managing additionally listed coke by-products wastes until permitted).

Currently permitted facilities that manage today's proposed wastes after their listings are finalized by EPA, must request permit modifications if they are to continue managing these wastes in units that require a permit. Since EPA will initially be responsible for processing these permit modifications, the new Federal procedures for permit modifications will be followed (see 53 FR 37934, September 28, 1988). These new procedures contain a specific provision for newly listed or identified wastes (see § 270.42(g)). This provision generally requires that a permitted facility that is "in existence" for the newly listed or identified waste on the effective date of the waste listing must submit a Class 1 modification by that date. Essentially, this modification notifies the Agency and the public that the facility is handling the waste and identifies the units involved. By submitting this notice, the facility is temporarily allowed to continue management of the newly listed wastes until the Agency can make a final change to the permit. Next, within 180 days of the effective date the permittee must submit a more detailed permit modification request (*i.e.*, a Class 2 or 3 modification). This information will be used by the Agency to develop a final permit change. For more information on permit modifications see the September 28, 1988 preamble discussion referenced above.

### List of Subjects

#### 40 CFR Part 261

Hazardous waste, Recycling.

#### 40 CFR Part 271

Administrative practice and procedure, Confidential business information, Hazardous materials transportation, Hazardous waste, Indian lands, Intergovernmental relations, Penalties, Reporting and record keeping requirements, Water pollution control, Water supply.

#### 40 CFR Part 302

Air pollution control, Chemicals, Hazardous substances, Hazardous materials, Hazardous waste, Intergovernmental relations, Natural resources, Reporting and recordkeeping requirements, Superfund, Water pollution control, and water supply.

Dated: July 12, 1991.

William K. Reilly,  
Administrator.

## IX. References

1. Van Osdel, D.W., *et al.*, Environmental Assessment of Coke By-Product Recovery Plants. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-600/2-79-016. January 1979.
2. U.S. Environmental Protection Agency. Benzene Emissions from Coke By-Product Recovery Plants, Benzene Storage Vessels, Equipment Leaks, and Ethylbenzene/Styrene Process Vents—Background Information and Responses to Technical Comments for 1989 Final Decisions. Final Environmental Impact Statement (EIS). Research Triangle Park, North Carolina. Publication No. EPA-450/3-89-31. August 1989.
3. U.S. Environmental Protection Agency. Development Document for Effluent Guidelines. New Source Performance Standards and Pretreatment Standards for the Iron and Steel Manufacturing Point Source Category, Volume II. Washington, DC Publication No. EPA 440/1-82/024. Final Draft. May 1982.
4. RCRA 3007 Questionnaire Responses. 1985.
5. RCRA 3007 Clarification Request Responses. 1987
6. Shine, B. Memorandum to Coke Project File documenting waste generation estimates. February 1989.
7. Development Planning and Research Associates, Inc. (DPRA). Draft Final Report on Cost and Economic Impact Analyses of Listing Additional Hazardous Wastes From the for the Coke By-Products (Coking and Tar Refining) Industry. Prepared for Economic Analysis Branch, Office of Solid Waste, U.S. Environmental Protection Agency, June 1990.
8. Background Document for the Proposed Listing of Coke By-Products Wastes. June 1990.

For the reasons set out in the preamble, it is proposed to amend title 40 of the Code of Federal Regulations as follows:

**PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE**

1. The authority citation for Part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922 and 6938.

2. Section 261.4 paragraph (a)(10) is revised and paragraphs (a)(11) and (a)(12) are added to read as follows:

**§ 261.4 Exclusions.**

(a) \* \* \*

(10) Coke and coal tar from the iron and steel industry that contain or are produced by recycling EPA Hazardous Waste Nos. K060, K087, K141, K142, K143, K144, K145, K147, and K148. The process of producing coke and coal tar from these wastes is likewise excluded from regulation. This exclusion does not apply prior to the point of mixing wastes with coal or coal tar.

(11) EPA Hazardous Waste Nos. K060, K087, K141, K142, K143, K144, K145, K147, and K148 when reinserted into coke ovens as feedstock to produce coke. This exclusion does not apply prior to the point of reinsertion of wastes into coke ovens.

(12) All wastes from the coke by-products industry that are hazardous only because they exceed levels for hazardous constituents in § 261.24, when these wastes are reinserted into coke ovens as a feedstock to produce coke. This exclusion does not apply prior to the point of reinsertion of wastes into coke ovens.

3. Section 261.32 is amended by adding the following hazardous waste listings to the subgroups Coking and Pesticides:

**§ 261.32 Hazardous wastes from specific sources.**

\* \* \* \* \*

Industry and EPA hazardous waste no.	Hazardous waste	Hazard code
* * * * *		
<b>Pesticides:</b>		
K147.....	Tar storage tank residuals from coal tar refining.	(T)
K148.....	Residues from coal tar distillation, including, but not limited to, still bottoms.	(T)
* * * * *		
<b>Coking:</b>		
K141.....	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).	(T)
K142.....	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.	(T)
K143.....	Process residues from the recovery of light oil, including those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.	(T)
K144.....	Wastewater treatment sludges from light oil refining, including, but not limited to, interception or contamination sump sludges from the recovery of coke by-products produced from coal.	(T)
K145.....	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.	(T)

4. Appendix VII of part 261 is amended by adding the following waste streams in alphanumeric order as follows:

**APPENDIX VII.—BASIS FOR LISTING HAZARDOUS WASTE**

EPA hazardous waste no.	Hazardous constituents for which listed
* * * * *	
K141.....	Benzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.
K142.....	Benzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.
K143.....	Benzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene.
K144.....	Benzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene.
K145.....	Benzene, benz(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene, naphthalene.
K147.....	Benzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.
K148.....	Benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.

**PART 271—REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS**

5. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

6. Section 271.1(j) is amended by adding the following entry to Table 1 in chronological order by date of publication:

**§ 271.1 Purpose and scope.**

\* \* \* \* \*

(j) \* \* \*

**TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984**

Promulgation date	Title of regulation	Federal Register reference	Effective date
[Insert date of final rule publication].....	The listing of wastes from the production, recovery, and refining of coke by-products produced from coal.	XX FR XX [Insert page citation of final rule].	[Insert effective date of final rule.]

US EPA ARCHIVE DOCUMENT

Authority: 42 U.S.C. 9602; 33 U.S.C. 1321 and 1361. republished without change.

**PART 302—DESIGNATION, REPORTABLE QUANTITIES, AND NOTIFICATION**

**§ 302.4 [Amended]**

7. The authority citation for part 302 continues to read as follows:

8. Section 302.4 is amended by adding the waste streams K141 through K145, K147 and K148 to Table 302.4. The appropriate footnotes to Table 302.4 are

**TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES**

Hazardous substance	CASRN	Regulatory synonyms	Statutory		Final RQ		
			RQ	Code †	RCRA waste No.	Category	Pounds (Kg)
K141 Process residues from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations).			1*	4	K141	X	1 (0.454)
K142 Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.			1*	4	K142	X	1 (0.454)
K143 Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.			1*	4	K143	X	1 (0.454)
K144 Wastewater treatment sludges from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.			1*	4	K144	X	1 (0.454)
K145 Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.			1*	4	K145	X	1 (0.454)
K147 Tar storage tank residues from coal tar refining.			1*	4	K147	X	1 (0.454)
K148 Residues from coal tar distillation, including, but not limited to, still bottoms.			1*	4	K148	X	1 (0.454)

† —indicates the statutory source as defined by 1, 2, 3, 4, or 5 below.

4 —Indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001.

1\* —Indicates that the 1-pound RQ is a CERCLA statutory RQ.

[FR Doc. 91-17238 Filed 7-25-91; 8:45 am]

BILLING CODE 6580-50-M

US EPA ARCHIVE DOCUMENT